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GRAVEYARD

HANDBOOK

OF

WEST COAST COUNTRIES
PANAMA AND THE CANAL, AND THE
WEST INDIES

BY

C. GRAND PIERRE

AUTHOR OF "WE MAY LEARN FROM LATIN AMERICANS," ETC.

H. H. GALLISON, PUBLISHER
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ESTABLISHED

HANDBOOK

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by C. Grand Pierre and H. H. Gallison.

PREFACE

There is no need of apologizing for the writing and publishing of this book. The interest in Latin American and West Indian countries is growing, but no comprehensive, complete book of general information about them has, as yet, been written in a popular way and published.

This seems to justify giving to this volume a little place under the sun, and space in private and public libraries.

If there is need of apologizing, it is because of this:

The manuscript has been written very hurriedly during a busy trip in almost record time. It has been printed under difficult conditions on board of a steamship (the "Santa Elisa," Grace Line), while at sea.

Hence many imperfections of grammar, rhetoric, typography, etc.,—unavoidable under the circumstances.

C. GRAND PIERRE.

242 W. 49th Street, New York., U.S.A.

CHAPTER I.

SOUTHWARD BOUND

The first day out of New York, on our way to Valparaiso, is usually uneventful. After emerging out of the Narrows—between Fort Hamilton and Fort Hancock—we successively leave Staten Island, Coney Island and Sandy Hook behind, dropping the pilot near Scotland Lightship. Then, we sail with the Jersey coast for a little over two hours and, well before night-fall, we enter our career as deep water sailors.

The first interesting thing we meet along our course is the

GULF STREAM

the most voluminous and the most rapid of all sea currents. It is merely the continuation of other currents and a link in a great circular movement of the waters of the Atlantic.

On reaching the South American coast, the South Equatorial Current coming from the coast of Africa,

splits at Cape St. Roque (the eastern-most point of the South American Continent). One branch, the Brazil Current, is deflected southwards while the other proceeds northwards and mixes with the North Equatorial Current. The two drifts, blocked by the "V"-shape of the coast, enter the Caribbean, raising the surface by several feet, then flow into the Gulf of Mexico through the Yucatan Channel, the pressure being relieved through the Straits of Florida.

From its exit out of the Florida Straits, the current is named Gulf Stream. There, it is joined, and it soon becomes undistinguishable from a large body of water coming from the Region of the Lesser Antilles following the same course. The streams run north along the coast of the United States, (separated from it by a narrow strip of cold water known as the "Cold Wall") to a point east of the Grand Banks of Newfoundland.

Near the Grand Banks, the Labrador Current is met and, under the influence of the prevailing westerly winds, a drift current is set up misnamed the Gulf Stream Drift. On reaching the European coast, this drift splits, one branch running northwards, the other southwards, forming the Canaries Current which mixes with the Equatorial Current, thus completing the Cycle.

In the Florida Straits, the Stream's velocity often exceeds 7 knots. Along the coast, its average velocity ranges between 4 and 5 knots. Its temperature ranges between 75 and 82 degrees. F

GULF WEED

As soon as we reach the Gulf Stream, we begin to meet patches of Gulf or Sargasso Weed. It has long been believed that these aglæ come from the Sea of Sargasso, a large expanse of the Atlantic located roughly between 20 and 30 degrees N. and 45 and 65W. This "sea" is in part covered with such dense masses of weed that, legends say, that navigation there is dangerous. Another legend is that the weed is the funeral wreath of the lost Atlantis, which is said to have been a powerful kingdom 9000 years before Solomon's time and is supposed to now lay below the surface of the Sargasso Sea. It has now been determined that the Gulf weed originates in the Caribbean and the Gulf and that currents and winds cause its accumulation in the Sargasso Sea.

PHYSICAL CHARACTERISTICS OF THE SEA

We left New York at what is conventionally called sea level, and most of us believe that—barring waves and tides—our voyage will be on a plane surface. The truth is that certain parts of the Gulf of Mexico are often more than 20 feet above the level of the Atlantic along our course, and the Caribbean slightly higher. It is not a very big climb, but it is a climb nevertheless.

Were we to cross the Atlantic along what is known as the southern lane, we would have to go down a rea

hollow at least 200 feet below sea level along the North American coast.

The differences of level of the Oceans are due to various causes, two or more of them often concurring. There is first the gravitative attraction of the lands, which have an average density nearly three times that of water, and exert a considerable attraction upon sea water, causing what is known as the "Continental wave." Some measurements have indicated depressions due to that cause in the Atlantic as much as 650 feet below coast levels, but that has been disputed. However, it is admitted that sea level along the North American coast is 200 or more feet above certain areas in the Atlantic.

Currents also cause considerable differences in the level of the sea. This is especially the case in closed seas as the Caribbean and the Gulf, through the Equatorial current.

Evaporation is still another factor. Actual, repeated measurements in the Mediterranean indicate differences of level of 25 feet and more, apparently solely due to that cause.

Barometric variations have been found to affect the level of the Baltic and, presumably, have similar effect on other seas. In the Baltic each millimetre drop in the barometer has been found to cause a raise of 14 millimetres.

Winds also cause considerable differences of level, especially in estuaries, such as the Rio de la Plata.

There are also differences of level due to tidal phenomena, which present complicated features differing with localities.

Currents are due—at least partly—to causes similar to atmospheric circulation, mainly the unequal heating of the sea surface by the sun as well as the rotation of the earth. Tradewinds blow with great regularity towards the heat equator; they are mostly northeast winds in the northern, and southeast winds in the southern hemisphere, because of deflection by the spinning of the earth. Sea currents are deflected in a similiar manner; they tend to swing towards the right in the northern and toward the left in the southern hemisphere, unless otherwise influenced by the configuration of the coasts and other causes.

TIDES

The theory of tides is too complicated and too long to explain to find a place in these pages. Suffice it to say that tide predictions are made by reference to the time of the moon's transit across the meridian, corrected by the sun's influence and local observations.

The *Establishment of the Port* is the average interval which elapses between high tides. The establishment is the hour of high water at full change. *Spring rise* is the average height between high and low water at *spring tide* (the average highest tide). *Neaps* has a similar meaning as concerns low water

CHEMICAL AND BIOLOGICAL CHARACTERISTICS OF THE SEA

Salinity differs much, both horizontally and vertically. On or near the surface, these differences are due mainly to varying degrees of evaporation. Vertical differences are not yet satisfactorily explained.

Viscosity is naturally influenced by both salinity and temperature.

Transparency differs still more with locality. In waters of the Western Hemisphere the most remarkable instances of extreme transparency are in the Bahamas, in the Caicos and Turks Island waters, and on the south coast of Jamaica, where the sunken remains of the former City of Port Royal, 60 feet below the surface, are often plainly seen.

In *color*, differences are also remarkable. It has often been doubted that the color of the water is actually blue, but this has been affirmatively ascertained by various experiments, by comparison with colorless liquids. Whenever the ocean water is not blue, it is due to local disturbances, reflection, or biological factors. Yet, great differences in blueness are not quite accounted for. For instance, along our course in the Gulf and the Caribbean, the water appears at times almost ridiculously blue, while elsewhere it is dark grey-green.

Life conditions in the sea vary even more than physical features, and, naturally, they are influenced

by temperature and local chemical composition of the water. Low salinity, for instance, especially where temperature is as uniformly low as along the west South American coast, result in favorable life conditions for a great variety and quantity of micro organism.

This low salinity and temperature are favorable to the absorption by the water and retention of atmospheric gases and of those produced by the pylosiological activities of marine plants and animals. Low salinity also makes possible the solution of suspension of increased proportions of silica which, with nitrogen compounds and phosphoric acids, are elements upon which all sea life is primarily dependent.

The original source of all food for higher sea life is the microscopic plant life which covers the upper layer of the Ocean at the average rate of 12,000 per quart of water. These become the food of lower animal life and certain fishes which in turn are devoured by higher animals and fishes. The relative scarcity of plant and animal life in tropical waters, compared with waters of temperate zones is due to less favorable conditions of life for micro organism.

THE WINDS

Winds have not always swept the surface of the Oceans; in olden times, mariners knew only oars to move their ships. It was very hard work, and the greatest reward which a good fairy could give to

fishermen who had given her hospitality was to tell their captain of an island where the winds were held prisoners, and how to capture and use them.

The captain went, and loaded the four winds—the breeze, the trade winds, the gale and the tempest—in great big canvas bags. The crew was forbidden to touch the mysterious cargo until arrived home, but their curiosity was too strong. They opened the top-most bag which contained the tempest, which, when set loose, delivered the other winds. Ever since, we have had four kinds of winds upon earth.

Winds are more or less arbitrarily classified and named according to their velocity as estimated or measured by an instrument called anemometre.

Breezes are classified by mariners as good, fresh and stiff, the latter of maximum 40 miles velocity.

Half a Gale is equivalent or a little stronger than a stiff breeze; a *strong gale* is akin to a storm, and between the two are several kinds of gales usually designated by the velocity of the wind. The word gale is rarely used without qualification.

Storm winds on the waters of the Western Hemisphere, south of the U. S. A., are usually called *hurricanes*. These storms are exceedingly rare along the west coast north of 40 degrees latitude south.

Many people unfamiliar with the Gulf and the Caribbean fear West Indian hurricanes, but without reason. Taking the vast area of these seas into consideration, West Indian hurricanes are very much less frequent

and many times less destructive than North American tornadoes.

Records of the last 155 years show that they average less than one a year in the entire West Indies, and that they are restricted to comparatively small areas and follow a well defined path. Their approach is always heralded—sometimes 2 to 3 days in advance—by curious, sudden variations of the barometer. Fewer ships are sunk because of hurricanes than other causes.

By far the greatest number of hurricanes happen during July, August and September, and an old West Indian adage says:

June, too soon;
July, stand by;
August, you must;
September, remember;
October, all over.

Very rare are the so-called *northers* on the western Caribbean.

SEA SICKNESS

Sea Sickness is often unnecessarily feared by "first trippers," and by those who have been affected by it during previous sea voyages. Indeed, it is now generally admitted that an anxious mental attitude acts the opposite of a prophylactic.

The following explanation is usually given as the most immediate cause of the ill feeling given that name.

The rolling and heaving of the vessel disturbs the feeling of a correct relation of the body to the surrounding objects. The sense of security decreases and even ceases. The nervous system, subjected to a succession of shocks fails in its function to reestablish the disturbed equilibrium. The whole organism is weakened and unable to offset the effects of periodical displacement of the organs during movements of the ship—especially the stomach—with the well known results.

The primary causes of sea sickness are mental. As a matter of fact, cases of people becoming sea sick long before the vessel begins to move are not unfrequent.

No specific has been found which really prevents or cures seasickness. The best anyone can do is to go aboard in quite a matter of fact way, as if boarding a train. It is best not to diet, but to live as nearly as possible as one would on shore, and rest a little more.

SOME "SEA" TERMS

Officially, the *directions* on vessels of the U. S. Navy are called front, rear, left, right. However, to regular seafaring men—even in the Navy outside of official documents—the old *oak and hemp* day's terms: *fore*, *aft*, *port* (formerly *larboard*) and *starboard*, will continue to be right.

The *sides*, from the *bows* to the *stern*, form the *body* of a ship; *'tween wind-and-water* is the water's

edge; the upper outline of the sides is the *sheer*; waste water from rain, seas *shipped*, etc., runs along the *waterways* into *scuppers* into the sea. The white painted sign on the sides, a circle, some lines and capital letters is the *Plimsol Mark*, the lines and letters indicate the depth to which the ship may be loaded in winter (W.), fresh water (F. W.), etc., according to Lloyd's survey. The railings forward are just rails, those amidships are *quarter rails*, those aft are *taff-rails*.

It is only since the advent of huge floating hotels that some seafaring people have begun to use the words windows and doors. Properly speaking, they are *hatches*, *ports*, *hatchways* and *port holes*. Stairways are *ladders*, whatever their size, but two ladders running to or from the same part are *companions*. The main *companion* is the "stairway" leading from the dining room to the music room. In olden days, the main companion was something akin to a sacred spot; every man uncovered himself while using it, and only the master of the vessel kept his cap on. The main landing, above the main companion, is the *companion way*; the ladder let down the sides in ports is the *accommodation*.

There are no floors nor ceilings aboard, but *decks* and *deckheads* and no partitions, but *bulkheads*, no skylights, but *deadlights*. The kitchen is the *galley*; the crew's kitchen, when separate from that for passenger service, is the *ship's galley*; the deckhand's

quarters are the *focs'l.*, the steward's quarters the *glory'ole*. To go to bed is invariably *turn in*, to start work is to *turn to*.

Whatever his age, the captain is always the only *old man* aboard; there is only one *chief*, the chief engineer, and only one *boss*, the chief steward. *Bones* was formerly the cozy name given to the ship's surgeon, but now he is more familiarly known as *pills*; the electrician is *sparks* and the name is given to the wireless operator; the chef is the *doctor*, the carpenter is *chips*; the deck department's store keeper is *lamps*, the steward's Departments storekeeper just *stores*. *Seaman* designates any member of the crew and the word is never used in the sense of seafaring man. On the other hand, *sailor* designates both a member of the deck department and seafaring man at large.

A ship *sits* in the water when under way, but *rides* at anchor, if she stands the weather well, she is a *good sea boat*, otherwise a *crank*, a *tub*, or an *old wagon*. To get under way is to *gather speed*; to sail along a coast is to *sail with the wind*; to stop is to *heave to*; the *weather side* is whence the wind comes, the *lee side* is the sheltered side.

A *ship*, correctly speaking, is exclusively a *full rigged* vessel, namely, with three or more *square rigged* masts; a *bark* has *fore* and *main* masts square, and *mizzen* mast *fore-and-aft* rigged. A *barkentine* has the foremast *fore-and-aft*, the others square. A *brig* has two square masts, a *brigantine* one square

and one fore-and-aft mast. A *schooner* has two or more masts fore-and-aft rigged, a schooner without top sails is said to be *baldheaded*. Smaller *sailers* are *sloops* and *goelets*.

Before the commercialization of the steamship, the U. S. created still a different type of sailing vessel, the *clipper* and among these the *Baltimore clippers* were the most famous. Until beaten by the *Lusitania*, one of these held the transatlantic record. They were vessels designed for speed, along the lines of yachts, with three or four square rigged masts and sometimes *small* auxiliary fore-and-aft, either fore or aft, or both.

The division of the masts are: *mast*, *top mast*, *royal*, *top gallant*, and *sky scraper*. Above the latter, clippers had, sometimes, *moon sails*.

The sails are *canvass*, the ropes with which sails are handled are *halyards*, the ropes at the bottom of sails are *sheets*; the ladders leading up masts are *shrouds*, the rungs of the shrouds are *ratlines*. Old sailors hardly knew the word rope, but distinguished *hawasers* and *cables*, according to method of manufacture. Smaller ropes are *lines*, *heaving lines*, *slings*, etc.

The red and the green light on port and starboard, respectively, are the *running lights*. A white light, exhibited when the vessel has *hove to*, 15 degrees above foremast light, is the *anchor light*; two or more lights above one another on fore mast indicate that vessel is towing one or more barges.

Navigation is the art of working out a course and determining the *location* of a ship. It may be attained by the study of books, even before setting foot on a vessel. *Seamanship* is the art of managing a vessel in all weathers and under all conditions. Evidently, it can be attained only by long practice. *Pilotage* is the art of conducting a ship along coasts and in inland waters; it requires both seamanship and knowledge of geography.

Light Houses, buoys, etc., are *aids to navigation*. Signs and signals along shore, especially in inland waters and estuaries, are known as *balissage*. The *rules of the road* are the laws governing the movements of vessels when near other vessels. The *fairway* is equivalent to right of way on land.

CHAPTER II

THE BAHAMAS

The third day out of New York, we approach the *Bahamas*, the most extensive archipelago in the Western Hemisphere. They are an 800-miles long string of 229 islands, 661 "cays" and 2,387 rocks, extending from the southern coast of Florida, 25 miles off shore, to near the coast of the Dominican Republic.

For the last half a century, the southern group of the Bahamas, known as the *Turks and Caicos* Islands have been politically separated from the Bahamas, and they now depend from Jamaica, while the other islands are administered from Nassau—the famous winter resort—on the island of New Providence. The Bahamas are divided into administrative groups, with a local administrator representing the Government.

The total area of the Bahamas is 5,540 square miles and the total population is 60,000. In general, the Bahama Islands are long and narrow, and present a flat appearance. Many of them rise barely above water and are hardly more than sand banks or rocky

islets. Only one of them, New Providence, is really very fertile.

Their main exports are sisal, sponges (mainly handled through the Sponge Exchange in Nassau), salt, turtle shells, and small quantities of pineapples, and log and fustic wood.

Some years ago, the Bahamas pineapples were famous and higher prices were obtained for them than even for Porto Rico fruit. However, the American customs tariff, preferential duties in favor of Hawaii, and lack of cold storage facilities destroyed the industry. An American company operates a pineapple canning plant near Nassau, but its products are exported to the British Isles.

The only one of the Bahamas which is well timbered is *Abaco*, where an American Company exploits large pine forests and have established a modern plant and founded a town called *Wilson City*. About 80,000 feet of pine board are sawed daily. The company operates a 15-miles long railway, the only one in the Bahamas, and employs some 500 people.

From two-thirds to three-fourths of the trade of the Bahamas is with the United States and United States currency circulating as well as English coin and notes and Canadian five-dollar bills.

Watling's.—Unless delayed by weather or other causes, we pass *Watling's Island* during the latter part of the afternoon of the third day out of New York.

PERHAPS NOT COLUMBUS' LANDFALL

Mariners' charts and most maps call it "San Salvador or Watling's Island," and indicate it as the first landfall of Columbus, Oct. 12, 1492, during his first voyage. Much printer's ink has been employed in endeavors to prove or disprove this supposition. Many writers are of the opinion that one of the Caicos and Turk's Islands, north of Santo Domingo was the spot, while another current of opinion is in favor of Columbus Point, at the southeast end of what the charts call Cat Island.

The administration of the Bahamas seems to have sided with the latter opinion, as all official documents of the Colony call San Salvador Island what the charts and the maps call Cat Island.

Watling's Island is about 12 miles long and from 5 to 7 miles wide, with slightly indented shores. Its interior is largely cut up with salt water lagoons, separated by low hills. Its area is 60 square miles and its population (1911 census) 617. The main industry of the island is cattle and sheep raising, including breeding stock famous in the Bahamas.

Watling's Light erected on the highest point, Dixon Hill, towards the northeast, is visible 19 miles, showing two short flashes, followed by eclipse, every 30 seconds. It is exhibited from a stone tower 165 feet above the water.

Immediately north of Watling are *Green Cay* and *White Cay*, recognized by their appearance. South

of Watling's are the *Hinchbroke Rocks*, near which is the wreck of a sailing vessel. Another wreck is visible near the light house.

San Salvador Island, or *Cat Island*, just named, is left out of sight to the west. It is somewhat in the shape of a 42-miles long leg with 15-miles long foot and 3 miles average width, an area of 160 square miles and a population of 5,072. It is the loftiest of the Bahamas, with a maximum elevation of nearly 400 feet. There is no sponge fishing in these waters, but, as a whole, this island is the most fertile of the Bahamas, except New Providence.

A few miles west of the latter, lies the islet of *Little San Salvador*.

We also leave out of sight, west of us, the islet of *Conception*, on which Columbus is supposed to have remained several days to pray. A little to the south is *Rum Cay*, with an area of 29 square miles and a population of 430, and *Long Island* (not to be confounded with Long Cay), 57 miles long, 3 miles at its widest, an area of 130 square miles, and 4,160 inhabitants.

From 6 to 7 hours after passing Watling's light, we should come to the height of *Bird Rock*, a rocky islet, little more than one square mile in area, located about one mile north of Crooked Island, but when approached from the north, appearing as if part of the latter. Its light, exhibited from a conical stone tower faced with blue brick, easily visible from the ship when passed

by daylight, shows, 120 feet above water, for 15 seconds every 90 seconds.

ENTERING THE GULF OF MEXICO

We have now entered the *Crooked Island Passage*, one of the six channels available to large vessels passing from the open Atlantic into the Gulf of Mexico.

Immediately south of Bird Rock, we have *Crooked Island*, which is not nearly as crooked as Acklin, its neighbor. It is irregular in shape, about 10 miles long and 6 miles at its widest, with an area of 76 square miles and a population of 1,441. It is generally low and wooded, with a range of hills, pretentiously called the Blue Mountains, gradually rising towards its center, reaching a maximum altitude of 200 feet, and an isolated elevation of about the same height towards the south end, called Mount Pisgah. By clear weather, and with a good glass, we may distinguish some of the houses of the chief town, Portland Harbor, near the northern end of the island.

OF PIRATICAL FAME

After crossing an expanse of open sea some 12 miles wide, we see parts of the west shore of *Long Cay* (not to be confounded with Long Island), better known as *Fortune Island*. It is about 10 miles long, vary-

ing in width from 1-4 miles to nearly three miles. It is nearly level, raising gradually to 110 feet altitude, at Fortune Hill, near the south end. Its only settlement, *Albert*, is the seat of the administration of the Crooked Island group of islands and the principal shipping point for a number of islands around. Before the War, passenger liners of the Atlas line, called there fortnightly, and during the building of the canal, many hundreds of laborers were shipped from there. Albert is a neat little town, with two or three buildings which may be called comparatively pretentious.

From the southern end of Fortune Island, the "bank" curves southeastward, and then in a straight, southerly direction, forming an 11-miles long string of islets, the *Fish Cays*, some of which are visible from the deck.

Our next landmark is *Salina Point*, the eastern end of the southern part of *Acklin Island*. Acklin is 48 miles long and 7 miles at its widest, but for most of its length it is only from one to three miles wide. Its area is only 120 square miles and its population 1732. From its shape, it would well deserve the name Crooked Island given to one of its neighbors. *Wells*, its chief town, trades mainly with Albert.

We leave to our west the *Mira Por Vos*, a cluster of islets, some of which are visible from the ship with a good glass.

Soon after Salina Point, we pass *Castle Island*, a mere rocky islet. From a conical tower with three

bands of red brick is exhibited, 114 feet above water the only fixed light of the three first orders in the Bahamas. It is visible 17 miles.

East of our course, we leave, some 25 miles away, *Great Inagua*, the third largest of the Bahamas, with an area of 560 square miles and a population of only 1,343.

CHAPTER III

CUBA

Cape Maysi, which we usually reach during the forenoon of the fourth day out of New York, is the easternmost end of Cuba. When seen from the north, the range of hills south of the Cape appear as if rising in series of steps; a little further south, we may observe curious folds in the formation of the mountain sides. In the distance, we see the Cobre (copper) mountains, so named because of their appearance at certain times of the year. Among them is a remarkable landmark, the flat topped Yunque (anvil) of Baracoa.

The coast about the cape is fringed with a white sandy beach, behind which is a belt of scrubby wood. The hillsides are rocky and barren, but the land on the plateau above is among the most fertile of Cuba. The region is not only agriculturally rich, but, during the war, was a great producer of manganese ore.

The nearest port on the north coast is *Baracoa*, a sugar and banana port. The city was founded by Diego Columbus in 1514.

On the south coast, we may distinguish three dis-

tinct ranges of hills. Behind the second is Guantánamo, the U. S. Naval Base, and behind the third lies Santiago.

Cape Maysi Light is exhibited from a white circular tower, located on Point Hombra, 2 1-2 miles from the extremity of the Cape; it shows three short flashes, followed by a longer eclipse, within 20 seconds. Not far from the light house, we may observe the hull of a tanker aground, appearing more as if riding at anchor near the beach.

45 miles east of Cape Maysi is *Mole St. Nicholas*, Haiti, which people of that country like to call the Gibraltar of the West Indies. There are no fortifications there, nor need of any, but the writer has been told very seriously by educated Haitians, that if Haiti had the money, it would beat the record in erecting there fortifications which would much surpass the "Rock."

As a matter of fact, the title "Gibraltar of the West Indies" was given a century ago to Brimstone Hill, on the island of St. Kitts, one of the Lesser Antilles, where one of the struggles took place which gave Great Britain the naval supremacy it has enjoyed since. But, while the strategic possibilities of Mole St. Nicholas were sorely neglected, there are, not many miles away, along the north coast of Haiti, the ruins of La Ferriere, probably, with the exception of the ruins of Inca fortresses in Peru, the remains of the most gigantic fortress on earth. La Ferriere was built by

“Emperor” Christopher of Haiti, a native and runaway slave from the island of St. Christopher, who, apparently, aimed to imitate and surpass what his former English masters had done on Brimstone Hill, on his native island. Below La Ferriere are the ruins of what must have been wonderful palaces and gardens of “King” Milot, another of the many short lived rulers of the Black Country.

Between Cape Maysi and Mole St. Nicholas, the straits are called and form the *Windward Passage*, one of the four channels available to large vessels passing from the Gulf of Mexico into the Caribbean Sea. The other passages are: The Yucatan Passage (between Mexico and Cuba), The Mona Passage (between the island of San Domingo and Cuba), and the Virgin Passage (between Porto Rico and St. Thomas).

Our next landfall will be *Navassa*, which we usually pass about 9 hours after Cape Maysi.

THE PEARL OF THE ANTILLES

Cuba was discovered by Columbus on his first voyage, on October 28, 1492. He landed in the vicinity of the place where the town of Nuevitas now stands and took possession of the country in the name of Spain. From that time until the peace of Paris was concluded in December, 1898, the progress of the country was relatively slow and by no means commensurate with its natural richness and susceptibility of development.

Cuba extends in a direction from northwest to southeast—its northwestern extremity being Cape San Antonio, in west longitude $84^{\circ} 55'$, and its southeastern extremity Cape Maisi, in longitude $74^{\circ} 12'$. There is a distance of 740 statute miles between these capes, and Maisi is 250 miles farther south than San Antonio. The island is only 120 miles wide at its broadest part, and it averages from 60 to 100 miles. Its total area is 44,164 square miles, or 114,385 square kilometers, being thus a trifle smaller than the State of Pennsylvania. Of this area only 15 per cent is in cultivation.

The census of 1913-14 gives the total population of Cuba as 2,465,428. The average yearly increase in the population is 70,000, the excess of births over deaths being 40,000 and the average yearly immigration about 30,000. Many of the immigrants are a good type of hard-working folk from Spain, who, availing themselves of the opportunities that the country affords, soon acquire land or work in the cities as artisans, small storekeepers, and in other commercial lines. Of late there has been considerable immigration from the neighboring islands of Haiti, Jamaica, Barbados, and others, owing to the necessity for farm labor. These newcomers are nearly all negroes.

In the last century especially its growth was retarded by revolts against the constituted authorities. There were uprisings by the Cubans in 1823, 1826, 1828, 1830, 1848, 1850, 1851, and 1855. These were followed by the "Ten Years' War," which continued (mainly in

guerrilla fashion) from 1868 to 1878. Another insurrection was started in 1881. The cost of suppressing these attempts at revolution had been assessed by Spain against the colony, and the total was \$295,707,264, or more than \$185 per capita. The cost in blood and destruction of property was incalculable. Then came the final revolt of 1895, the declaration of war by the United States, April 19, 1898, and the subsequent terms of peace by which Cuba was given freedom December 10, 1898. The United States administered affairs in Cuba for a time, carried out an effective sanitary program in Habana, and inaugurated public works and similar improvements. Finally, on May 20, 1902, an election having been held under the provisional government, the island was turned over to a president and congress of its own people. Cuba had at last become a nation in its own right and the struggle of more than 80 years was over.

The lessons of sanitation taught by the Americans were well learned. The principles were put in force throughout the island, and with yellow fever absolutely eradicated the progress of Cuba since 1902 has been rapid and in many respects remarkable.

HAITI AND SAN DOMINGO

The island which we pass at starboard the fourth day out of New York, variously called Haiti and San Domingo, is the second in size of the Antilles, its area being two thirds that of Cuba. It is one of the first

discoveries of Columbus and was called by him Hispanola.

The mainland of the island contains about 31,000 square miles, and of this area the eastern two-thirds is occupied by the Dominican Republic. The remainder, or 10,204 square miles, comprises the Republic of Haiti. In addition there is the island of Gonaives, 38 miles long and 5 or 6 miles wide in places; the Isle de Tortue on the north, which is 22 miles long and from one-half to 4 and 5 miles wide; Vaches Island on the south, Grand Caimite, and lesser islets, which, altogether, add several hundred square miles to the Haitian territory.

The population of the Republic Haiti is estimated at two million.

Port au Prince, the capital, situated on the southwest side of the Republic, and surrounded by a sort of horseshoe of mountains, is recognized as one of the hottest ports in the West Indies. It gets none of the trades, and until the sun goes down it receives the ardent rays. There is little air movement, and in general, the humidity is high. During the rainy season—that is, from the middle of April to the middle of October—the heat averages from 94° to 96° every day; and during the “dry” season from October to April, the temperature ranges from 84° to 86° . If the dry land breeze blows, the thermometer goes up to 90° or perhaps a few degrees higher. The nights, however, are at times from 10 to 15 degrees cooler than the days.

The people of Haiti are almost entirely pure-blooded negroes, the mulattoes, who form about 10 per cent of the population, being, it is believed, a diminishing class. However, the persons with an admixture of white blood, by reason of their better education and opportunities, constitute the more progressive element and furnish many of the leaders of the people. The Haitian are generally of an amiable disposition, polite and courteous to a degree, considerate of others, and possessed of good manners; this is especially true of those who have had the advantage of instruction.

The main exports of Haiti are coffee, fustic and log wood, guaiac, castor oil and hides and skins.

With the exception of one or two large agricultural concerns in hands of foreign capitalists, agriculture in Haiti is in a very primitive stage.

The country is a protectorate of the United States, supposedly self-governing, but U. S. Navy officers are in charge of the activities of most departments of the Government.

THE DOMINICAN REPUBLIC

The Dominican Republic occupies the eastern two-thirds of the island of Haiti and has an area estimated at from 18,000 to 19,325 square miles.

The population of the Republic is estimated at 800,000. Unlike Haitians, they are very largely mulattoes with a considerable admixture of Carib Indian blood. The language of the people is Spanish.

Since 1898, the U. S. has been by treaty in charge of the Finances of the Republic, but in 1919, by order of the Wilson administration, American army officers took entire and absolute charge of the government of the Republic. However, in 1921 a considerable amount of municipal autonomy was restored to Dominicans.

The agriculture of the country is on a higher level of development than that of Haiti. Sugar, cotton and cocoa being the principal exports.

PORTO RICO

Porto Rico is about 450 miles slightly southeast of Cape Maisi, the eastern point of Cuba; it is 77 miles east of Haiti, and 40 miles west of the island of St. Thomas in the Virgin group. San Juan is 1,407 miles from New York, 1,255 miles from Norfolk, 1,539 miles from New Orleans, and 959 miles from Colon. Habana, Cuba, is 1,045 miles from the Porto Rican capital.

It is the easternmost island of the group called the Greater Antilles, which is composed of Cuba, Jamaica, Haiti, and Porto Rico. Its geographical position is between $17^{\circ} 54'$ and $18^{\circ} 30'$ north latitude and $65^{\circ} 35'$ and $67^{\circ} 15'$ west longitude. Its conformation is that of an irregular parallelogram, the length east and west being somewhat less than 100 miles and the average width north and south about 35 miles.

Porto Rico is one of the summits of the great range

of submerged mountains that rise from immense depths in the ocean and form the Greater Antilles as well as the group of islands farther to the east. The vast proportions of this mountain chain may be judged from adjacent deep-sea soundings. The "Brownson Deep," one of the most profound chasms on the globe, is a little less than 100 miles off the northcoast of the island. From here this stupendous range rises from a depth of 27,000 feet to the mountain summits above sea level. One writer upon Porto Rico has made the graphic statement that the West Indian Islands are only the protruding tips of the mightiest and most precipitous mountain range in the world, and that if it could be pushed up above the surface of the water it would reach heavenward to a greater height than that of Mount Everest in the Himalayas. The ocean depths near the archipelago are the greatest known in the Atlantic.

The total area of 3,606 square miles includes Mona Island, in the Mona passage; the island of Caja de Muertos, southeast of Ponce on the south coast; Viequez, or Crab Island, off the center of the east coast; Culebra Island, about 18 miles east of Cape San Juan; and some smaller islands near the northeast corner.

Under the former regime there were only two classes of people in the island—the rich and the poor. Under the American regime there is gradually growing up a middle class, neither rich nor poor; but the number of poor people in need of help and guidance is very large.

The average Porto Rican is a mixture of races. In the early part of the sixteenth century a large number of African slaves were introduced, and this strain has since received impetus, especially along the coasts, where there has been immigration of negroes from the thickly populated British islands. Some of the people show evidences of Indian blood, while the Carib type is sometimes apparent.

The planters, merchants, professional men, and large landowners were usually of pure European stock, and they have taken great pride in keeping that stock pure. There are a great many persons of pure European descent on the island, but the average "jibaros," or countrymen, and "peones," or laborers, are usually of indeterminate origin, showing traces of Indian, Negro, and Spaniard.

The census of 1910 gave the population of Porto Rico as 1,118,012. At the estimated rate of increase, the total population at the beginning of 1916 must therefore have been approximately 1,200,000. The census figures of 1910 gave the island a population of a fraction over 310 to the square mile. It is the most densely populated area under the dominion of the United States, except the States of Rhode Island and New Jersey, and it is one of the most thickly populated countries in the world. The annual increase represented by the excess of births over deaths amounts to 2 per cent. of the whole population, and the problem of overpopulation is already an acute one. Gov. Yager, in an ad-

dress at the Lake Mohonk Conference in 1915 estimated the population in that year at 350 per square mile, and he stated this to be a greater density than that of China or India and about equal to that of Japan. The distribution is general, and the center of population is only 5 miles from the geographic center of the island. Only 10 per cent. of the people live in cities. Only about 1 per cent. are of foreign birth, and there is practically no immigration except from the United States.

JAMAICA

After passing Cape Maisi, we leave another of the Great Antilles, Jamaica, 000 miles west of our course. It is the third largest of the four islands included in the "Greater Antilles," and it lies in the Caribbean Sea between $17^{\circ} 43'$ and $18^{\circ} 32'$ north latitude, and between $76^{\circ} 11'$ and $78^{\circ} 20' 50''$ west longitude. It is 90 miles from the southern end of Cuba, 100 miles from Haiti, and 540 miles from the Colon entrance to the Panama Canal. It has a length of 144 miles, its greatest width is 49 miles, and its total area is 4,193 square miles, or 2,683,520 acres. Of this amount only 646 square miles, or 413,440 acres, are flat land, the rest being hills and mountains, in large part uncultivable.

While the population of Jamaica was given as 831,383 by the census of 1911, it was estimated in 1916 at 897,196 and in 1917 at 895,692, the slight loss being

accounted for by the excess of emigration of laborers to Cuba and the Canal Zone and by military departures. The nonarrival of East Indians during 1917 was also a factor in the loss.

The principal resources of Jamaica are agricultural, although there is much forest wealth and a number of deposits of minerals. Small streams, only a few of which are navigable even for rowboats, abound, and, with the ample rainfall, are of great importance to the farms and estates.

AN ISLAND WITH A PAST

Navassa, the island with a past is only about two miles long and one mile wide. It is rather level, rising abruptly from its shores in cliffs from 20 to 60 feet high to a plateau rolling gently to a maximum elevation of 250 feet. Its approaches are forbidding and landing is impracticable except on one spot, on the northwest shore, and where landing platforms have been erected.

There is no water on Navassa and it is covered with scrubby vegetation. Until construction of the lighthouse was begun, there were no inhabitants and the only near-domesticated beings living there were wild dogs, cats and goats, the progeny of animals left there by former guano workers.

In spite of its smallness and its barrenness, Navassa is unusually interesting.

(1) It lies almost directly in the true course of vessels plying between the United States, Cape Maysi and Colon.

(2) The United States has provided there a remarkable aid to navigation, a light visible 27 miles, exhibited 395 feet above water, from a cylindrical tower. It shows two short flashes, with a 6 second eclipse between, and a 23 second eclipse following, the whole within 30 seconds.

(3) Navassa was the object of diplomatic conversations with an unusual ending which, perhaps, was inspired, at least in part, by Esopus' fable of the Oyster and the Pleaders. Haiti, claimed Navassa by right of its geographical position. Spain appears to have had some claims on it, which Cuba thought she possessed as the successor of Spain. Both Governments appealed to Uncle Sam and asked him to decide against the other. Uncle Sam could have done what the judge in the fable did, but, wise as ever, he told both parties that a light on the island would enable passengers on steamers which may pass the island on a moonless night to have at least some kind of a view of the landscape, and that, incidentally, mariners coming that way would be much helped thereby. He added something to the effect that he would feel very much inclined to adjudge the island to the one of the pleaders who first would adequately illuminate the landscape. Exit of the pleaders. . . .

(4) Then, Navassa has a dark past. In the early eighties, some Guano was obtained there by an American concern. After the guano had been all removed, some phosphate rock was discovered. A company was formed in the United States to exploit what were claimed to be inexhaustible deposits of the precious mineral. It is said that promoters obtained something like sixteen million dollars upon these prospects. As a matter of fact, there were some phosphates on Navassa. The phosphorus of some of the guano had leaked into fissures and combined with the calcium of the lime stone. According to newspapers of that time, lack of production was explained by promoters first by "revolution" of the natives, then by seismic disturbances which destroyed the property.

If we pass Navassa early enough in the afternoon, we may see, before sundown the mountains of *Haiti*, beyond Cape Dame Marie.

We are now crossing the Caribbean and our next land fall will be *Manzanillo Point*, on the coast of Panama.

CHAPTER IV

PANAMA

After crossing the Caribbean, we are due to reach the coast of Panama at *Manzanillo Point*, on *Isla Grande*, in the early part of the afternoon of the sixth day of our voyage. The Canal Administration maintains a *light* there, from which alternating a white light visible 18 miles, and a red light, visible 5 miles, are flashed every five seconds.

From *Manzanillo Point*, it is a little less than two hours to the entrance of *Colon Harbor*.

Already an hour or two before passing abeam of *Manzanillo light*, the Panama coast may be seen in the distance. *Manzanillo* may be located well in advance, by observing where the land takes a sharp turn, "coming" nearer to us. Near there, one may distinguish two round islets, on the higher of which, nearer shore, a white spot may be seen—the light house.

HISTORY, TOPOGRAPHY, CLIMATE

"Isthmus of Panama" is a comparatively modern name. The Spaniards called Isthmus of the Darien the entire territory which forms the connecting link

between South and Central America, even after the main line of transcontinental travel had shifted from the Darien Region to the route Panama-Nombre de Dios.

Panama was a State of the Republic of New Granada from the time of the independence of that country from Spain, and it became a province of the Republic of Colombia at its reorganization until its secession, November 3rd., 1904. Panamanians claim that they joined the New Granada Confederacy as an independent nation and not as a province, and that the Republic of Colombia having broken the original covenant, they were justified in "resuming" their full independence.

The Territory of the Republic of Panama, including the Canal Zone has an area of 32,380 square miles, and a population claimed to be half a million, but is probably considerably less. In its makeup, the population shows strange contrasts. It includes, on the one hand, what ethnologists consider the most thoroughbred human race (the San Blas and other Indians, of which more later) and, on the other hand, the most nondescript mixture imaginable (various strains of Europeans, several Indian breeds, considerable negro admixture, and decided traces of Chinese and Jap blood).

Two mountain chains traverse the territory of the Republic, narrowing to a single range of hills in the region of the Canal. Several of the rivers of the country would be more useful arteries of communi-

cations were it not that for much of the year tropical rains increase their volume greatly, endangering and at times preventing navigation. Barring floods, the Tuya is navigable for small vessels for about 100 miles. The Bayamo, the Cocle, the Calebeborá, the Tarire and the Los Indios rivers are navigable from 20 to 60 miles.

It appears strange that there should be a considerable difference of climate and especially of rainfall between the Pacific and the Atlantic side of the territory of Panama, even at points as near one another as Colon and Panama. The rainfall along the Caribbean coast reaches 150 inches annually, while that on the Pacific side rarely exceeds 65 inches annually. The former has no dry season whatever, the latter sees no rain during the first four months of the year.

CANAL ZONE

The United States has acquired for 999 years absolute jurisdiction over 5 miles of territory on each side of the Canal, but the area of the cities of Panama and Colon were excluded. The United States has the right to govern and administer the Canal Zone as if it were its own, but, technically, this strip of land remains an integral part of the territory of the Republic of Panama and is not a U. S. possession. This treaty arrangement manifests itself in various ways. For instance, inhabitants of the Canal Zone pay custom du-

ties to Panama for everything they import personally. Also, a sojourn of five years in the Canal Zone is not residence in the United States in the sense of naturalization laws. Moreover, Panama has retained the post office privilege in the Canal Zone and has merely let the privilege to the U. S. P. O. in the Canal Zone. The latter uses Panama Stamps with surcharge, which it purchases at 40 cents on the dollar from the Republic of Panama.

Parts of the lands of the Canal Zone are very fertile and a great many of the Americans whose jobs have ended with the opening of the Canal would have liked to homestead there. But, Col. Goethals was in favor of making a wilderness of the Zone for military reasons and he succeeded in making a congressional commission and congress sees his way. Nevertheless, since the departure of Goethals, the zone has not been allowed entirely to revert to the bush, but, little by little, it is becoming an immense cattle range. Indeed, the Zone has already produced enough beef to permit exportation to some of the U. S. military and naval establishments in the Caribbean.

CENTERS OF POPULATION

The City of *Panama* was at first located six miles east of its present site, and interesting ruins of the old City, *Panama Viejo*, are still to be seen. The present city has about 65,000 inhabitants, about 12,000 of whom are whites, including many Americans. An-

con, a suburb of Panama City, and *Balboa*, the port of Panama, are within the Canal Zone.

Panama is the oldest city of European origin in the Americas and, in many ways, it has retained the character of an old Spanish City. A great deal remains of the city walls erected in 1673, when the city was moved to its present location. Among the ruins of Spanish times is an architectural curiosity, the Flat Arch, which is very nearly flat.

Colon, some years ago, might have been called a typical Central American town with West Indian fringes. Since the great fire, in 1915, which destroyed most of it, it may be said to be in a class by itself. Covered side walks, with posts just strong enough to support the story above, have replaced the arcades with the wide moorish archways which obscured the stores within. The architecture of the new buildings combine a sober mixture of the Italian taste for line design and Spanish color, and the result is a new city, constructed along practical and sanitary lines, with just enough adornment to render it attractive.

Colon has about 30,000 inhabitants, two-thirds of which are West Indian negroes.

On the other side of First Street begins *Cristobal*, Canal Zone, which is, in part, a residential city for Canal employees and the seat of offices of the Canal Administration and steamship agencies.

Little by little, the residences of *Cristobal* are giving way to office buildings and a new Zone residential

city is being gradually created at New Cristobal, towards Mount Hope.

David, the third city of Panama, and its port, Pedregal, are the outlet for the Province of Chiriqui, near the Costarican border. The province is a vast cattle country and coffee and cocoa of excellent quality are produced in appreciable quantities in the high lands, especially around Boquete.

Between Chiriqui and the Canal are the provinces of Los Santos, Cocolé, and Veraguas. The latter was named in honor of Columbus, who was made Duke of Veraguas.

It may be remembered that one of the direct descendants of the discoverer of the New World, a Duke de Veraguas de la Cerda, visited the Chicago exposition in 1893.

Veraguas province has another historical reminiscence, namely, Montijo, a district named from the old Spanish family of which Eugenie, Empress of the French, was a daughter.

On the Atlantic side, west of Colon, is Chiriqui Lagoon, with Almirante Bay, which are occasionally used as field for manoeuvres by U. S. naval units stationed in Canal waters. In that region, around *Bocas del Toro*, and also the newer town of *Almirante*, a little further north are very extensive banana plantations of the United Fruit Company, which are served by over 300 miles of railways.

THE ATLANTIC SIDE

Southeast of the City of Colon, the province of the same name extends for 200 miles towards the Colombian border. The dividing line between Colon Province and that of Panama is a mountain range called the Serrana del Darien. In this region, between the upper reaches of the Bayamo and the Chucunike Rivers live several Indian tribes who still maintain a large measure of isolation. Even the President of Panama has been refused permission to visit these territories.

Among these Indians are the San Blas, whose territory begins a few miles east of *Manzanillo Point*, the part of the coast of Panama which we passed about two hours before arriving in Colon. The territory claimed by the San Blas comprises a coastal strip of about 120 miles, together with some 360 islands and islets.

THE PUREST HUMAN RACE

Ethnologists say that the *San Blas Indians* are probably the purest race of humans. They are presumed to have inbred without a trace of foreign blood for some 1,500 years; they have never been subdued, either by the Spaniards or the Colombians. After it became independent, Panama planned to force them into submission, but gave up the project of a military expedition largely upon the representation of scientists.

Instead of force, the Government of Panama is endeavoring a policy of infiltration, however, with little success.

The San Blas are practically independent and they govern themselves by a form of patriarchal administration. Unlike other Indians, the San Blas do not live in huts, but in large sheds which sometimes house a dozen or more families. One of their laws is that no stranger is allowed to spend the night in their territory, but, some years ago, an exception was made in favor of a crippled, old, shipwrecked negro sailor. A year later, a San Blas girl gave birth to a colored child. The council of the nation decided that she, the father and their child should be put to death forthwith. More recently, another exception was made in favor of an English and an American lady, the latter, Mrs. Potts, who were allowed to remain and conduct a mission school. After mature deliberation, the council decided that they both were past the danger age.

In spite of inbreeding and voluntary isolation, the San Blas Indians show no sign of degeneracy. On the very contrary, they are a virile, intelligent race and, although very conservative in their opinions, they are far from "narrow." Many of their young men work as sailors on American or British sailing vessels, trading between the Caribbean and the North Atlantic coast. After from 5 to 7 years "at sea," they return to their beloved coast, never to leave it except for trading trips or occasional visits to Colon or Panama.

At all times, visiting San Blas are shown the utmost benevolent courtesy. The President of Panama once remarked, "after all, they are the only true Panamanians and the legitimate owners, though not the possessors, of the best part of the territory of the Republic."

The San Blas are not only sailors, but they are good traders. They bring to Colon ivory nuts, coconuts, balata, turtle shells, a few sponges and some gold. As a matter of fact, they contribute to the international trade of Panama in a very much larger proportion than any other factions of the people. It is claimed that their coconuts are the best in the world; they shell unusually well, are of fair size and of fine flavor and contain a larger proportion of "meat" and oil than most varieties.

HISTORICAL SPOTS

Some 10 miles west of *Manzanillo Point*, our first landmark along the Panama Coast, lies *Porto Bello*, which is said to have been named by Columbus himself. While he never had set foot on the American continent, it is said that this beautiful little harbor is the nearest he had come to Continental shores. There are interesting ruins from Spanish and Morgan times in Porto Bello.

In the same region is *Nombre de Dios*, in a district which is called *Tierra Firma* (main land). Accord-

ing to chronicles, the conquistador Juan de Solis was, in the year 1500, sailing the Caribbean in search of a mainland, the Spaniards, thus far, having discovered only islands. A sailor on the lookout having discovered a high hill, exclaimed "En Nombre de Dios sea, que veo tierra firma" (be it in the name of God that I see the mainland). The city founded there by Solis was then named Nombre de Dios.

A short distance inland from Nombre de Dios are quarries which supplied most of the enormous quantities of sand and gravel used in concrete-making during the building period of the Canal.

In the region are important *manganese deposits* worked by an American Company. In the hinterland, a Panama Company composed mainly of Americans, residents of the Isthmus, has a concession for the exploitation of "tagua" (ivory nuts) which is said to be abundant.

MEANS OF COMMUNICATION

The *railway mileage* of Panama, including the Zone, is somewhat over 500 miles, considerably over half of which are "banana roads" of the United Fruit Company.

The *Panama Railroad* was built and opened by an American company in 1855, to which the Government of Colombia gave an absolute monopoly of transportation across the Isthmus. At one time the Com-

pany even interpreted its concession in a way that prevented people from crossing the isthmus on foot with any kind of bundle. The seven millions worth of stock of the Company are now absolutely owned by the U. S.

The only other common carrier railroad is that of *Chiriqui*, a 3-foot gauge line from Pedregal and David to Boquete, with a spur to Buga.

Two great railroad projects have been discussed for a number of years, namely, one from the Chagres River to Almirante, and a line from Panama City along the Pacific coast to David, with junction of the present Chiriqui Railroad with both the United Fruit system in the region of Almirante, and the Costa Rican system. There has also been a project of settlement of the very fertile upper Chagres region and the construction of a railroad with terminal at Gatun.

These projects have faced from the start the open opposition and even the absolute veto of the Canal Administration and the U. S. War Department. The settlement of the upper Chagres is not desired because it may possibly endanger the water supply of the Canal and. For military reasons, the crossing of the Canal Zone by either roads or railroads is not likely to be permitted, however much the Republic of Panama may be benefitted by them.

Outside of the few miles constructed by the Canal Administration in the Zone, there are no roads worthy of that name in the Republic. Because of the heavy

downpours during the 8 months of the wet season, ordinary roads are frequently washed out, and the construction of weather proof roads would demand expenditure hardly in proportion to their need.

Nevertheless, the Government of Panama has now sufficient money available for the construction of 300 miles of new roads.

AGRICULTURE

The average soil of Panama is remarkably fertile and climatic conditions are very favorable to agricultural production, but in spite of efforts and encouragements given by the Panama Government, only a very small portion of the territory is under cultivation.

Bananas are the most important crop. The value of the holdings of the United Fruit Co. in the districts of Almirante and Bocas del Toro is estimated at considerably over \$10,000,000. *Coconuts* are the second largest crop and, in spite of present low prices, *Sugar* is promising.

Panama abounds in cane lands producing from 50 to 70 tons of cane to the acre. Coffee and cocoa of quality equal to the Costa Rican product are produced in increased quantities, and the cattle industry has attained considerable proportions. Some of the land and climatic conditions in the province of Veraguas are said to resemble the best tobacco lands of the Vuelto Abajo, Cuba, and tobacco of good quality is

produced there without the special care which that crop requires. Citrus fruit does exceedingly well, both on the Atlantic and the Pacific sides, and opportunities await California or Florida experts.

The importance of the forests of Panama has often been exaggerated, but, even if discounted, it is considerable. The largest and best timber tracks are on the Pacific side and exploitation is difficult because of inaccessibility and expense of transportation.

Gold and manganese in small quantities are the only two *minerals* mined in Panama.

A FEW CANAL FACTS

From Christobal to Balboa, the Canal runs in an easterly and *NOT* westerly direction, and the Pacific entrance is *east* of the Atlantic.

As the crow flies, the Pacific entrance is 22 miles from the Atlantic entrance, but the Canal is 45 miles long.

There is practically no difference of level between the Atlantic and the Pacific at the Canal entrances.

We cross the old French Canal soon after entering the Canal at Cristobal.

The minimum elevation of Gatun Lake is 84 feet.

When sailing Gatun Lake, the Channel runs almost directly over the now submerged towns of Gorgona and Matachin (the latter one of the French headquarters). Gorgona was for several years the head-

quarters of the mechanical division of the American Canal, employing 2,000 men.

There is no such thing as the "marriage of the Oceans." Traces of salt water enter Miraflores Lake; they are not sufficient to give the water a briny taste, but quite enough to make the water "hard" and unfit for domestic purposes. On the other hand, no sea water can ever reach above the third flights of locks.

The first flight of three locks, coming from the Atlantic, is at Gatun. The innocent looking long mound covered with green lawn is the famous Gatun Dam, THE real engineering feature of the Canal. The upper edge of Gatun spillway is at a minimum of 84 feet above the old bed of the Chagres River below. The surplus water of Gatun Lake—if any—is used as water power, to supplement the main powerhouse of the Canal, located at Miraflores.

The one flight lock at the exit of the "cut" is Pedro Miguel, which is pronounced in American "Peter Magill." At the exit of that lock we enter Miraflores lake and then the two-flight Miraflores locks.

At Miraflores are located the water works for the Pacific side of the Zone and the City of Panama. The water is taken from Gatun Lake and pumped to a reservoir visible from the locks. It is then filtered and aerated, the jets of the aeration works being visible from the ship. The waterworks for the Atlantic side of the Zone and the City of Colon are located at Mount Hope, two miles from Colon.

The town at the end of Gatun Lake, coming from Cristobal, is Gamboa, where, in August, 1913, the big dyke was blown up. The Chagres flows there into Gatun Lake, usually an innocently looking stream, but at times an impetuous torrent.

The locks are 1,100 feet long and 110 feet wide.

The first suction dredge used by Americans was a left over from French times. Three French tugs, two ladder dredges and quite a number of locomotives as well as other material dating from French times are still in use.

The huge steel structures at the entrance of each lock are emergency dams. Heavy chains raise automatically when gates are closed, to prevent damage to gates, should a ship get beyond control. The operation of the Canal depends upon a sufficient level of Gatun Lake and many devices were worked out to prevent the possibility of waste of water. The banks of Gatun Lake are patrolled daily to make sure that no damage to the bank has occurred which could endanger the level of the lake.

The following table shows distances from New York, in miles:

	Via Magellan Straits	Via Canal	Distance Saved
To Guayaquil.....	10,215	2,810	7,405
To Callao.....	9,613	3,363	6,250
To Valparaiso.....	8,380	4,623	3,757

The sanitation of the Isthmus, without which the Canal could not have been built, is the work of Col., later General Gorgas. Credit for Gatun Spillway is due to General Siebert. The plans for the conquest of Cucuracha, Gold, and Contractor's Hills, were made by Gaillard (hence the official name for Culebra Cut is Gaillard Cut). The mechanical devices of the locks were designed mainly by Schildhauer. Some of the features of the port terminals are the work of Naval Constructor, known as "admiral" Rousseau. The balissage and aids to navigation were planned by Captain, now Vice-Admiral Rodman. Goethals was not essentially a great engineer, but he was a great organizer, administrator and diplomat.

Next to these men, credit for the building of the Canal should be given to plain, ordinary American workmen, called on the Isthmus "rough-necks," and to the "high-brows" which constituted the office force.

These, at the beginning of the building period, faced the unknown, imperfect sanitation, malaria, lack of comfort and even hardships. They had to contend with even worse, nostalgia, loneliness away from home.

Credit must also be given to an intelligent administration which recognized from the start one of the mistakes made by the French. All the pastimes provided for the French employes were cheap cabarets, houses of prostitution, gambling and drinking—all demoralizing influences.

In contrast with that, the American administration,

from the very start, encouraged home life on the Isthmus in every possible way, and provided wholesome entertainment for the employes in the Club Houses, under Y. M. C. A. management.

Credit is also due to the many wives, daughters, sisters and other near-relatives who left comfortable homes and went to the Isthmus to stand by their men. Although they did not handle tools, nor bossed gangs of laborers, they have also helped build the Canal.

But 40,000 black and colored West Indian laborers must not be forgotten. With all their faults, they have, as a whole, been faithful helpers, and they were one of the essential instruments of Canal Construction.

LEAVING PANAMA

Immediately after leaving Balboa, we pass the islets of *Nao*, *Perico* and *Flamenco*, and, a fraction of a mile further, the rock of *San Jose*, with ruins of Spanish times. These islets are now U. S. reservation and form part of the Canal Defenses. The breakwater connecting these islands with the mainland was constructed with stone carried all the way from the Atlantic side, no rock of sufficient durability having been found on this side of the Cordillera.

On the west side, we may see a group of houses along the shore—the Palo Seco leper Asylum, with over a hundred unfortunate inmates.

The mountainous island now before us is *Taboga*, an island paradise, where one could just "live." It has an incomparable climate, free from mosquitoes and lovely scenery—waterfalls, and even small lakes and picturesque walks, as if made to order by a genius of an artist to adorn miniature valleys and mountains.

Taboga has been for generations the favorite "summer resort" of Panamanians and the Canal Administration maintains there a hotel and a home for convalescents. It is a great pity that those in charge of devising means of defence of the Canal have found it necessary to invade Taboga for the prosaic purpose of making parts of it a fortress. The military authorities have promised to the Government of Panama that the charms of the island will not be disturbed, and that it will continue to be a health resort for civilians; nevertheless, judging from previous experiences with "military necessity," they, with some justice fear that it will not be long until all Taboga will be declared military reservation.

Three small islets are appended to Taboga.

Viewed from the north, before we pass it, the island of *Taboguilla* appears as if laying south of Taboga, while it is almost due east of it. Immediately south of Taboguilla is the islet of *Urava*. Both islands are occasionally made the headquarters of grouper, saw fish fishing and inagua hunting expeditions by Canal employes. Next to Tarpon fishing below Gatun Spillway and crocodile hunting in the Bayano (chepo)

River, these are the most exciting sports on the Isthmus.

A little further along our course, we pass the island of *Chame*, which is very fertile, and the *Valladolid Rocks*. On the west shore of *Chame* is a village named *La Goleta*.

Some 20 miles south of *Balboa*, we pass the islands of *Otoque* and *Bona*. On the latter, the Canal Administration maintains a *light*, exhibited 700 feet above water from a white skeleton tower which we may distinguish on the top of the hill. It is visible 15 miles and shows a 3-second flash followed by a 10 seconds eclipse.

After passing *Bona*, we lose sight of land until we pass *Cape Mala*, some 7 hours after leaving *Balboa*. *Cape Mala light*, shows for five seconds every 20 seconds and is visible 18 miles.

After passing *Cape Mala*, we again lose sight of land until we come near *Cape Pasado*, on the Ecuadorean coast.

ANCIENT CANAL PROJECTS

After leaving *Balboa*, we cross the *Bay of Panama* lengthwise. To our east, slightly too far to be seen from the ship, are the *Pearl Islands*, well deserving of that name, and, beyond them, the *Darien*, and we almost regret to be unable to sail nearer that historically interesting region.

Modern man is so full of the thoughts of his own great achievements that he is inclined to forget that there is really nothing new under the Sun. When early New World navigators realized that the stretch of land which now forms the Republic of Panama was a barrier to the sea route to the Indies and China they were seeking, they quite naturally sought means of overcoming it.

Already in the 16th century, engineers made comprehensive plans for a *sea level* canal across the Isthmus of the Darien. By using the San Miguel River, it would have been only 25 miles long, 16 of which a tunnel under the Cordillera. At that time, Spain was by far the most wealthy and the most powerful country on earth, and Indian labor was available by the millions at the cost of their feed. No doubt at least an attempt to realize the project would have been made had not the Archbishop of Madrid advised King Phillip II, that "what God hath joined together, let no man tear asunder."

During the centuries which followed, the possibility of digging and boring a Darien Canal was often discussed and the impracticability of the idea has probably retarded by many years the actual attempt to make a trans-isthmian canal.

Americans interested in the Panama Railroad appear to have been the first to have seriously considered a canal between Panama and Aspinwall (as Colon was then named), but de Lesseps was the

first to make actual efforts to put the idea into realization.

A GIGANTIC SCHEME

The Darien is historically interesting also because of another gigantic scheme, in its financial scope even surpassing the financing of the Canal. It is one of the most stupendous undertakings ever devised and probably the most rapid and dismal great failure ever experienced by man.

In May, 1695, the freebooter James Chiesley approached William Patterson, the founder of the Bank of England, and proposed to him to make the Darien a great international free port, the commercial center of the world, and the key to world trade. A few years later, upon a favorable report from another adventurer, Lionel Wafer, Patterson founded a great commercial company to which the Scotch Parliament gave a monopoly of foreign trade. Plans for large cities were made; enormous warehouses were to be built and every one who invested in the undertaking was to become wealthy and a citizen of the world.

The scheme seemed so feasible that money almost flew into the offices of the Company. Bankers of the City of London subscribed among themselves 900,000 pounds, and other subscriptions amounted to many millions. In due time, many ships sailed for the promised land loaded with emigrants, mostly Scotch,

but the Indians killed many on arrival, diseases decimated their ranks further, and the Spaniards drove away the rest. Subsequent expeditions were not any more fortunate and all that is left of the great "Darien Scheme" are a few family and geographical names in the region.

The Darien is also historically interesting for legends of inexhaustible gold deposits. Many gold seekers made vain attempts to locate them, but nothing unusually interesting has ever been discovered. Only a small French company and a few individual gold diggers operate in the Darien at present.

CHAPTER V

TOPOGRAPHY CLIMATE

The Republic of Colombia (under Spanish rule the Vice-Regal province of New Grenada), after its emancipation the Republic of New Grenada and later the United States of Colombia, until the present central form of government was adopted, has an area of 1,235,214 square kilometres, or 476,916 square miles. In population, it ranks third among South American countries with 5,472,804 inhabitants, or 11.47 to the square mile. By far the majority are "mestizos," of white and indian mixed. Along the coasts there are many blacks and mulattos.

The *topography* of the country is very irregular. At what is known as the Knot of Pasco, near the Ecuadorean border, the mountains branch off into three main ranges, which form the northern extremity of the South American Andes and encloses a vast territory of very diversified aspect. The western range borders the Pacific Ocean; the Central Range separates the Cauca from the Magdalena River basins, while

the Eastern Range extends into Venezuela, forming the mountain backbone of that country.

The most important and best known *river* of Colombia is the Magdalena, which is navigable for about 1,300 kilometres (over 800 miles) and forms the principal artery of commerce of the country and especially the main highway to Bogota and Medellin. The Cauca, a tributary of the Magdalena, is 830 miles long, but navigable only for 325 miles. The Atrato, 350 miles long, but navigable for less than two-thirds of its length, empties near the Panama border, but its source is less than a hundred miles from one of the sources of the Orinoco, which flows into the Atlantic.

The artist, the lover of majestic mountain ranges, of awe-inspiring volcanoes, of appalling gorges and vertiginous precipices, of roaring torrents and picturesque scenery, of primeval forest contrasting with the colorful, luxuriant herbaceous growth, flowering vines and delicate orchids, as well as the admirer of idyllic pastoral nature and prosaic farming, will hardly find a country equalling Colombia.

One of the striking features of the *climate* of Colombia is that, although located entirely within the tropical zone, it is even more varied than that of the United States. There are entire Alpine regions, not merely isolated peaks, and between these and the coast lands almost every variety of climate imaginable is to be found. The record of equanimity of temperature is probably held by Popayan, in the Upper Cauca, where

the annual maxima vary only between 72 and 75 degrees, and the annual minima between 65 and 68 degrees.

The *principal cities*, with their populations, are: Bogota, 140,000 inhabitants; Medellin, 71,004; Baranquilla, 48,907; Cartagena, 36,632; Manizales, 34,720; Pasto, 27,760; Cali, 27,747; Cucuta, 20,364; Bucaramanga, 19,735; and Popayan, 18,720.

AGRICULTURE AND INDUSTRIES

The main industry of Colombia is agriculture. In spite of its mountainous character, probably as much as one-third of the area of the country is capable of development along agricultural lines.

The most important agricultural industry is *cattle*. In the department of Bolivar, there are over a million and a half head of cattle, and in the entire country probably considerably over five millions. The Government makes every effort to develop the industry. The largest cattle land concession is that of an American company, with headquarters at Mompos, on the Magdalena River. It controls about one million hectares (2,500,000 acres), between that river and the Cauca River.

Coffee is the second leading product of Colombia, the total exports reaching over 20 million dollars an-

nually, about two-fifths of which so-called "Bogota," produced in the Department of Condinamarca.

Bananas are also one of the major crops, an average of 6 million bunches being exported annually from Santa Marta alone.

Sugar and *Cotton* are normally well paying crops and their culture by modern methods would seem to offer many opportunities.

The *forest resources* of Colombia are enormous, but the best timber tracks are located too far from adequate means of transportation to be immediately available. Thus far, only mahogany and Spanish Cedar are exported in large quantities.

The only *manufacturing industry* of Colombia, which has attained some degree of intensive development, is the *textile*, in which some 4 million dollars are invested, mostly local capital, in 21 establishments. Their entire production is consumed by the domestic market.

MINERAL WEALTH

Almost every known variety of commercially important *mineral* is found in Colombia, and great future is promised to the mining industry, when once better means of communication will have been established.

For some years, both American and British interests have had men scouring the country for *oil prospects*,

and they also have had political agents in Bogota and in departmental capitals, in an endeavor to obtain monopolies, and, in default, concessions.

Oil interests have so overbidden one another, and spent so much money uselessly, that many private owners of oil lands have gained an exaggerated value of their holdings and thus actually retarded development. Moreover, development has also been retarded by the fact that some of the best oil fields are located in almost impenetrable sections of the country, to which oil drilling machinery and supplies can be carried only with great difficulties.

Since Russian production ceased, Colombia has become the most important source of *platinum* in the World.

The history of mining of that metal has quite a romantic side. It was discovered in the district of Choco by a French expedition, which reported its resistibility to acids as a curiosity. The metal was considered valueless because of the difficulty in working it. It is only in the 19th century that laboratory demands, and especially the requirements of the electrical industry caused platinum to take rank among the precious metals.

Previously, in the placer mining of Colombia, platinum was thrown away with the waste, but when its price rose, dumps were reworked and even the streets of Quibdo were torn up and washed for particles of the metal. Platinum mining in Colombia is controlled

by an American and an English syndicate, who are said to have made a pooling agreement.

Very nearly all the *emeralds* mined in the world come from Colombia. It is little known that, in spite of the popular idea that diamonds are the most precious of stones, carat for carat, emeralds of adequate purity attain much higher prices than diamonds.

Emerald mining in Colombia much antedates the time of the Conquistadores, and it is only a century after the conquest of Colombia that the Spaniard discovered the source of the stones which the natives wore as ornaments. The exploitation of emerald mines is a Government monopoly, subleased to British and American mining companies. Owing to the inaccessibility of the deposits, mining operations are of the most primitive nature.

Coal, ranging from lignite to bituminous, is found in various parts of Colombia, and developments would have permitted the country to become self sufficient, were there better means of communication between one section and another. Although yet practically in its infancy, those who have coal interests in Colombia claim that ere many years pass the country will become an important coal producer, supplying not only all its needs, but also those of a large part of other countries of the Americas and of the West Indies.

There are quite a number of *gold mining* enterprises in Colombia and the gold mining possibilities

of that country are probably unsurpassed in the Western Hemisphere.

In Spanish times, Colombia produced much *copper*, but its production has practically ceased.

Fine *hematite iron ore* has been located not far from Bogota, but absence of an iron industry leaves these deposits, as yet, useless.

MEANS OF COMMUNICATION

Unfortunately, navigation on the Magdalena River, the principal artery of traffic of Colombia, is much hampered by shifting sands along its course, and especially at its mouth, preventing ocean vessels from reaching Baranquilla. Various projects for breakwaters, which would cause the river to scour and maintain its own channel, have been under consideration for years. None was executed because of the uncertainty that the expenditure of several millions would achieve the desired end.

There are some 1,000 miles of railroads in Colombia, most of which are isolated lines, without connections with one another, mountain ranges preventing their junction. However, a comprehensive railroad program is progressing normally and it will not be many years until one may be able to ride from the Venezuelan border to Buenaventura on the Pacific, and from Baranquilla to Bogota and into the far interior.

THE WONDERFUL CAUCA

Probably the most interesting part of Colombia, is that which we are leaving east of our course, namely the *Cauca*. Its port is *Buenaventura*, which, at one time, had as bad a reputation as Guayaquil, and still has that of being the place where it rains more heavily and more often than anywhere in the world, though the record is probably due to the Island of Dominica, one of the Lesser Antilles.

The agricultural possibilities of the *Cauca* are great, there are there yet, many thousand acres of practically level and unusually fertile land awaiting rational cultivation. Sugar and cotton especially are very promising crops. Moreover, the *Cauca* is probably the largest as yet, practically undeveloped placer gold field in the World. Many men of many nationalities wash gold there in a small way, but no large dredging enterprises have yet been found practicable or successful.

The people of *El Valle*, as the *Cauca* is called, are averse to large foreign capitalistic enterprises which would disturb their quiet, comfortable way of living, and would make many of their men the near-slaves of capitalists and many of their daughters their servants. To the stranger, who wonders at their lack of progressive aggressiveness, they reply, "the gold will not get bad, by remaining a few years longer in the sand." They say: "we do not wish mining booms such as you

have had in the United States, with their disastrous moral consequences." Indeed, while permits to wash gold by primitive methods are easily obtainable, licenses for the importation of large mining machinery demands the undergoing of much red tape and delays and it has more than once happened that when a stranger finally succeeded in overcoming all difficulties, and was about to set up his machinery, either himself or the latter disappeared in the river through unforeseen accidents.

A RAILROAD AND A CURSE

The Cauca Railway (Pacific Railway Co.) has an interesting, one might almost say, dramatic history. In the 60's, a French company obtained a concession for a railroad to Cali and actually began construction work, which was interrupted by the Franco-Prussian War.

When building operations were resumed, legend has it that a little priest cursed the undertaking, and predicted that no trains would run during the generation. Since then, Colombian, American, British and French companies have successively resumed and abandoned construction work for one reason or another, always something "happening" to prevent the completion of the line.

It is only in 1919 that the line was opened first to Cali (108 miles); later to Popayan (21 miles), from which

it will ultimately be extended to Pasto and the Ecuadorean border and finally join the Ecuador railways. From Cali, a spur has been completed to Palmira (16 miles), and it is being continued towards Ruga, Tuluma and Cartago.

From there, the line will be carried through the Quindio valley and across the Central Cordillera to Ibague, the capital of the Department of Tolima, where connection will be made with the Tolima Railway. When this line will be completed, probably in 1923, a through railroad route will be opened from Buenaventura and Bogota and indeed, the Colombian capital will at times, be reached more quickly via that route than via Baranquilla and the Magdalena River.

A LITTLE PARADISE

Popayan, one of the present terminals of the Cauca Railway, is wonderfully located. The region was described by both von Humboldt and by Boussingault, as the Paradise of America. Hardly anywhere in the world are to be found within a small area as great a variety of scenery, sub-tropical vegetation, fertile plain, mountain forests and rocky bluffs, the whole surrounded by a crown of snow capped peaks, one of them, the Purace volcano, in almost constant eruption.

The climate of Popayan has already been described as even surpassing that of Mexico City.

A DIFFERENT MENTALITY

If the people of the Cauca are conservative and decidedly averse to intensive development, as understood in the United States, there are both economic and historical reasons for it.

A man, prominent in the affairs of that part of Colombia, who had traveled much, told me quite frankly: "Yes, it is wonderful what Americans have done with the Island of Porto Rico; however, the "peons" are not working less under "Yanqui" masters than they are under previous land owners. On the contrary, they enjoyed more freedom under the former system. As concerns the whites, there were hundreds of families in Porto Rico living from a few acres in sugar or coffee, which they called "estate," and able to indulge in the

practice of art and literature, or the study of sciences, but now have to drudge for a living."

This may not be exactly correct. At any rate, it tells only one side of the story of improvements in Porto Rico. Nevertheless, it seems to be the view which the people of the Cauca take of possible American "invasion."

The historical reason for their conservatism is that their ancestors, in the 18th century, left the turmoil of the coast, 70 families strong, and went to live in the wonderful Cauca Valley in order to escape the continuous warfare of so-called civilization along the coast. They desired to be left alone and this desire, this tendency has remained among their descendants.

Yet the people of the Cauca are far from being ignorant and narrow in their views. Popayan boasts of the second oldest higher institution of learning in the New World, and one finds in the Cauca, probably, a larger proportion of really interesting and cultured people than almost anywhere in a community of that size in the Western Hemisphere.

An expert in Cauca matters, always glad to give information on its resources and opportunities, is Mr. Emile Bizot, a resident of Cali, the principal city of the Cauca.

The Cauca has given to Colombia many of its great men. Popayan was the native place of the author of "Maria," which, Spanish-Americans claim, is one of the two or three greatest pieces of literature the Americas have produced.

CHAPTER VI.

THE SWITZERLAND OF AMERICA

Ecuador has been called the Switzerland of South America, because of the picturesqueness and grandeur of its scenery. It occupies a nearly three-cornered territory from the Pacific Ocean to the Upper Valleys of the Amazon, with Colombia in the north and Peru in the South. The boundaries being in dispute with its three neighbors, no two authorities agree as to the exact extent of its territory and its population. They are usually given at about 120,000 square miles and a million and a half inhabitants.

The climate of Ecuador naturally varies according to altitude. At Guayaquil the average annual temperature is 76 degrees and the rainfall 91 inches, mainly during the months of January and February.

At Quito, the average temperature is 55 with a maximum of 69 and a minimum average of 46. The average rainfall at Quito is 49 inches.

Leaving out of consideration the few foreigners engaged in business, the people of *Ecuador* consist of three classes—Indians, halfbreeds, and whites. The

Indians constitute the overwhelming majority of the people and are the agricultural and unskilled laborers of the country. The half-breeds are the mechanics, servants, and small traders. Farm wages range from 5 to 15 cents a day, and Government wages, paid to those working on the Government railroad are from 30 to 40 cents a day. There are possibly 80,000 people in Quito, 80,000 in Guayaquil, 30,000 in Cuenca, 14,000 in Riobamba, 12,000 in Latacunga, 10,000 in Loja, and from 6,000 to 9,000 each in Ambato, Esmeraldas, Guaranda, and Ibarra. Few of the cities and towns have assumed important as yet.

MINERAL RESOURCES

The mineral resources of Ecuador are probably quite as great as those of Colombia, Peru, Bolivia and Chile, but no systematic survey has ever been attempted. However, considerable prospecting has been done both by individuals and by geologists paid by the Government, but actual development has remained very far behind that of other west coast countries.

Until the war-time and the post-war search for new sources of supply of fuel oil, no one thought that Ecuador might become one of the great *petroleum* producing countries. As a matter of fact, the first oil company of Ecuador, the Ancon Oil Company, founded by Ecuadoreans, with British and French capital and

technical management, and also the Ecuador Drilling Company, whose capital was subscribed by the shareholders of the former, suspended operations in 1913, because it did not pay, and because additional capital to continue development work was unobtainable. A curious fact is that the refining plant of these companies continued operation for a time mainly for the production of asphalt.

The coast we are passing now, and especially the region of Esmeraldas, north of it, are rich in oil, but the best known deposits are in the region of St. Elena, near Santa Elena Point, which we pass some eight hours after Cape Pasado. This region is roughly 90 miles from Guayaquil, and 750 miles from Panama. The geological strata and conditions are said to be similar to the Peruvian fields. Indications of oil have also been found in the southermost province of Ecuador, that of Loja.

Ecuador possesses important *coal measures*, but only small quantities of lignite are mined at Biblian, near Cuenca, southwest of Guayaquil, across the Cordillera. These coal fields will soon be reached by a branch railroad and presumably, normal exploitation will then begin. Technical difficulties have thus far prevented the exploitation of highly inclined coal beds along the Guayaquil-Quito R.R. and other coal strata which present more favorable conditions for working are too far from existing means of communications to be interesting.

Both hematite and magnetic *iron ore* of remarkable purity have been located in the provinces of Chimborazo, Loja and Pichincha, but are not worked. *Gold, silver, manganese* and *platinum* are mined in small quantities, while deposits of *mercury, zinc, lead, mica* and *sulphur* have been determined but are not worked.

AGRICULTURE

With the exception of the region around Quito, Agriculture is yet in a very primitive stage, and until recently progress has been extremely slow. Thus far, few settlers from Europe have come to that country, but with the present efforts of the authorities, and the co-operation of British, French, Italian and even Chinese capital and initiative which began to interest itself in Ecuador's possibilities, greater progress is expected.

Formerly, the world was largely dependent upon Ecuador for its requirements in *cocoa*, but very large increase in acreage of West Africa, Venezuela and the West Indies, has become a hard competition. The *cocoa* industry employs directly or indirectly a relatively large proportion of the population, and a number of joint-stock companies have from time to time been formed to carry on the raising of the product on an extensive scale. Two of the largest companies are German, working the Seminario, Puga, and Clementina

Estates. Some of the plantations are under British control, and the remainder are, for the most part, locally owned.

The "Asociacion de Agricultores" has for several years absolutely controlled prices.

Tagua (*Ivory-nuts*) has been for years of very great economic importance to Ecuador. The tagua shipped from Esmeraldas has the reputation of being the best in the world.

The *cadi* is the tagua or ivory-nut tree, often referred to by English-speaking people as vegetable ivory, and by Latin Americans as *coroza* nuts. This forest product has proved to be an excellent raw material for making buttons, novelties, chessmen, and other articles that previously were manufactured from bone, ivory, and similar hard substances. It grows wild in the forests, and the cost of production involves only the work of gathering and transportation. Of the world's total output Ecuador's contribution is estimated to reach nearly four-fifths. There are unmeasured forest areas where the tagua has never been gathered. In the Province of Manabi, it is said, 60 per cent of Ecuador's ivory-nut exports originate. Other Provinces in which tagua is gathered, in the order of their importance, are Esmeraldas, and Guayas. Up to this time no industries for manufacturing articles from tagua have been started in Ecuador. It has been rumored, however, that a license has been granted for establishing a modern button factory in Manabi.

TAGUA AND CHINESE HONESTY

Some 90 miles north of Cape Pasado, lies the little port of *Esmeraldas*, from which most of the Ecuadorean *tagua* (ivory nuts) is exported. *Tagua* is the seed of a palm, growing scattered in the valleys of the interior. It is collected by Indians and brought to the coast in part on men's backs or in canoes and *balsas*.

These *balsas* are made in some regions of reed, or palm leaves solidly interwoven so as to make the craft watertight, but more often of *balsa* wood, which is the lightest wood in the world. When one has seen these *balsas*, one can understand how the Pacific islands were populated and grasp the possibility of migrations from the American Continent to Asia, if not vice versa.

But, to come back to *Tagua*, the article was, for some years, so much in demand that European, American, and even Japanese manufacturers had their resident buyers in *Esmeraldas* and other Ecuadorean ports. These often paid for the coming crop months ahead and at times as much as nearly one year in advance. At the beginning, many nationalities were engaged in the trade of bringing *tagua* to the coast, but, finally, only the Chinese were found honest enough to be trusted with huge sums of money.

A few miles north of Cape Pasado, lies the town of *Monte Cristi*, where the finest and most durable so-called *panama hats* are made from the leaves of

the Toquilla plant, locally better known as Jipi-Japa fiber.

Rice, cotton and *sugar cane* could as successfully be grown in Ecuador as in her southern neighbor, Peru, but thus far production has remained small.

Although there are considerable areas that might be used for *pastoral* purposes, the development in this field has been comparatively slow. A small number of horses and mules are exported, as well as some hides. Practically all of the wool clip and meat supply are consumed in the country.

The *forest resources* of the Amazon region of Ecuador are as great as that of her neighbors, but as yet practically unexploitable because of total lack of means of communications.

Ecuador is the home of the *cinchona tree* and of numberless medicinal plants; when attention is properly directed to this source of national wealth, a large number of these plants will be placed under cultivation, with benefit to the grower as well as to the world in general.

Many curious and valuable Ecuadorian vegetables and fruits at present unknown to the American table are being investigated by the United States Department of Agriculture.

It is curious to note that much of the *fruit* consumed in Lima and other Peruvian cities is imported from Ecuador.

One of the most notable plants of Ecuador is the

toquilla, which resembles a palm, but belongs to an entirely different family, the Cyclantaceae. It furnishes the *straw for Panama* hats, the most valued manufacturing industry of the Republic, the exports of which amount annually to over \$1,000,000. It is claimed that Ecuador originated this form of hat, and although similar manufacture is carried on extensively in near-by districts of Peru, in western Colombia and several other South American countries, Ecuador furnishes nearly all the toquilla straw and Ecuadorians have been called on as instructors. Native weavers in Ecuador refer to the toquilla straw as cuencas.

The weavers do their work by hand in the early morning because the greater atmospheric humidity at that time makes the straw more pliable and readily manipulated. Weaving under water, which, outside of Ecuador, seems to be generally considered essential in making Panama hats, is not generally practised in the Republic.

Another straw commonly used by hat weavers is called gualaginzas, brownish in color, secured in greatest amounts from forests east of the Andes. This class of hats, although darker, is in demand by the natives owing to the greater resistance of the fiber. The Province of Azuay is the center of the hat industry.

MEANS OF COMMUNICATION

Ecuador's only important railway, that which connects Guayaquil with Quito was built by Archer Har-

mon, an American. The construction was begun in 1897 and the line finally opened to traffic in June, 1908. The road measures 462.2 kilometres (287.5 miles) from the starting point. Duran opposite Guayaquil, to the Quito terminus. The gauge is 3 feet 6 inches, and the highest point is Urbina, with an elevation of 11,841 feet above the sea. Beyond Huigra is the most steep section of the line, with curves of 29 degrees and gradients of 4 per cent. This railroad is one of the most interesting in the world.

The other railways of Ecuador, of a total mileage of less than 300 miles, are unimportant, and even if all serious railroad projects were realized, the railroads of the country would not exceed 600 miles.

The most important recent railroad and development project, is that of an Italian Commission, of some twenty experts, which spent several months in Ecuador during 1920 and 1921.

The projected line would start at Puerto Bolivar, the port for Machala south of Guayaquil, and the first section run to Meso. from there, one trunk line would go north to Cuenca and then join the Rio Pastaza, an affluent of the Marañon. The southern trunk line would serve Loja and have its terminal at Borja. An Ecuadorean syndicate is working in co-operation with the Italians, and, it is interesting to note that a syndicate of Chilean capitalists has also interested itself in the undertaking. They intend beginning operations at once.

SOMETHING ABOUT MONEY

The gold standard unit in Ecuador is the "sucre," legally fixed at \$.487 U. S. cy., or 2 shillings, ten sucres being equal to £1 st. Coins in use: Gold piece of 10 sucres called 'Condor' and silver pieces of 1-2, 1-5, 1-10 and 1-20 of sucre. No paper currency.

A CITY WHICH IS DIFFERENT

A tropical city of South America which is different from any other is *Quito*, the capital of Ecuador. Located 9343 feet above sea level on a plateau 114 miles from the Pacific Ocean, this sleepy old city is of little commercial importance, but is interesting from the historical standpoint and as an example of medieval life surviving at the present day. It has about 60,000 people who live in houses betraying more definite marks of Spanish and Moorish influence than any other city in the Americas, and is cooler than many places a thousand miles farther north or south.

Quito is one of the oldest cities in the world. It was a city of temples and palaces and contained vast treasures which were buried by the Indians at the time of the Spanish conquest in order that they might not fall into the hands of the Spaniards. But notwithstanding the many changes, the town itself has preserved its own landmarks and customs, on account of the large population of Indians.

HAS REDEEMED ITSELF

So much does a traveler hear to the detriment of Guayaquil before arriving that it is not unnatural for him to enter the Republic for the first time with a decided prejudice. But in development, cleanly appearance, and other respects the city now compares most favorably with cities of other west-coast South American countries, while conditions of living and facilities for transacting business are far better than reports would lead one to anticipate.

Guayaquil was to the Western Hemisphere what Port Said was to the Mediterranean, namely, so to say, a personified pest hole, but, now it may be considered for all times free from epidemics of the many tropical diseases which gave it such ill fame.

This has been accomplished by the Rockefeller Foundation, in co-operation and with the help of the authorities, in the face of great difficulties, among which was the indifference and even the antagonism of a portion of the Indian and half-breed population.

The "marina" or quay wall has been constructed along the shore of the river for a considerable distance. Extending backward is a broad area along which a large maritime traffic is received and dispatched. The port proper is about 3 miles long and from a half to a mile broad, with a depth of from 12 to 40 feet.

The city, of course, has its modern side, as fine modern buildings, carriages, electricity, telephones and

good hotels. It has splendid churches, a cathedral, an opera house and a park-promenade. But the modern side of the city is not half so interesting as the old architecture and the picturesque natives. The various Indian tribes, the small houses with their Old World little balconies, the narrow city streets, offer the traveler quite an attractive sight.

Quito is the seat of the Government, the Episcopal Palace and the National University.

GUAYAQUIL IS THE METROPOLIS OF ECUADOR

Guayaquil is located 70 miles up the Gulf of Guayas and the estuary of the Guayas River. The five hour sail from the open ocean, if the vessel has proceeded from the rainless coast of Chile and Peru, offers delightful contrasts in beautiful tropical foliage and picturesque surroundings.

Guayaquil is the metropolis of Ecuador. So largely does the commercial, and political life center there that travelers often say "Guayaquil is Ecuador." Over the docks of this city more than 85 per cent of the Republic's imports are entered and distributed inland, while of the country's total exports 90 per cent, mostly carried out from the interior, are credited as cleared from this port.

The harbor of Guayaquil delights the average traveler with its number of small sailing vessels, many of which

have the appearance of oriental form and life and which transport to Guayaquil a vast quantity of natural products gathered by natives in tropical forests along the streams mentioned.

SMALLER PORTS

The more northern ports of Ecuador are Manta, Bahia, and *Esmeraldas*. From each of these ports considerable quantities of raw products are shipped annually, but as yet it is necessary to load cargo by the old method of the small boat and lighter.

At each of these ports, short railways make at least a start toward the interior. The plans are to continue them toward Quito and eventually to carry them across the mountains into the Amazon region.

Except Quayaquil and Quito, there are few places of importance in the Republic.

We are due at Cape *San Lorenzo*, some three hours after passing Cape Pasado. Some five hours later, we should pass *Santa Elena Point*, mentioned above, where we begin to cross the Bay of *Guayas*

A SHORTLIVED NEW STATE

We leave some 500 miles to the west the famous *Galapagos* (turtle) islands, which were often mentioned

in the press as possible German, British, Japanese and American naval bases. The fact is that no Government of Ecuador would survive one hour the news that their alienation to a foreign power is as much as contemplated. Hence, the stories may just as well have a rest.

On the other hand, it is well to remind the reader that, a few years ago, there were press stories of a "revolution" of the Galapagos and the formation of an independent Government which placed itself under the protectorate of the United States. There was some foundation to the story. An American seafaring man had settled on the Galapagos, acquired a small fleet of sailing vessels and gradually worked up a monopoly of trade in turtle and turtle shells. He worked so systematically that the interesting animals were threatened with complete destruction.

The Ecuadorean Government issued rules for their protection which practically put an end to the business of our friend. He did not like it, nor did the short-sighted natives working with him, and he did not have much difficulty in persuading them to become free citizens under the egide of Uncle Sam, who would protect them without bothering them.

A gunboat arrived three days later from Guayaquil and the would-be new free and independent state was obliterated a few minutes after her arrival. Her commander was considerate enough to refrain from depriving the freedom loving American from his beloved

liberty, but he advised him very strongly to favorably consider a change of air. After due consideration, our friend "Captain" * * * decided that the climate of Panama would be very suitable and as it happened to be also the nearest on the map, he went and settled there and for several years operated a small fleet of coastwise vessels from Panama City.

CHAPTER VII

TOPOGRAPHY

The 680 square miles of territory possessed by Peru are divided by the Andes Mountains into three distinct zones, each of them almost a world by itself. They are the Coast Belt, the "Sierra," which includes the high Andes and the plateaux and valleys between them, and the "Montana," or that large territory on the other side of the Andes.

The first of these zones, running along the coast line for a width of from 20 to 80 miles, is arid and is said to have been rainless for 6,000 years or more.

The second zone, the Sierra, is formed by the two main chains of the Cordillera, the Western and the Eastern Andes, from 90 to 120 miles distant from one another and in part cut up by the Central Andes. Between these is the *Altiplano*, the high plateau of Peru and Bolivia, at altitudes of from 9,000 to 13,500 feet.

Geologists estimate that the Andes and the high Andean plateaux were formerly *several thousand feet lower* than at present. Remains of mastodons,

ant eaters and other animals are found at elevations at which they could not have lived.

RIVERS

There are three main watersheds in Peru. Some 46 rivers, which all have their source in the Western Cordillera flow toward the Pacific, but most of them are dry before they reach the Pacific during the summer season and some of them even during the entire year, their waters being taken for irrigation, or lost through seepage or evaporation. The second watershed is that of the Amazon. The third includes all the water originating south of the "Knot of Vilcanota," South of Cuzco, which empty into Lake Titicaca. From there a remarkable navigable channel, partly natural, partly made by man, brings these waters to Lake Poopo, whence they flow into affluents of the Rio de la Plata.

CLIMATE

Geographically, Peru is entirely within the tropical zone, namely, between 3 and 19 degrees south, but the peculiar configuration of the country causes a great variety of *climates*.

The coastal belt is naturally the warmest, but, there, the temperature is maintained comparatively low because of proximity to the high Andes and the Humboldt Current (see page 96). The summer temperature fluctuates between 75 and 82 degrees, rarely reaching

88. During the so-called winter months, the average temperature is 55 with a minimum of 55.

Climatic conditions in the high plateau and the Amazon region vary greatly. It is hot in some of the enclosed valleys, temperate or cold on the high plateau and, naturally, glacial in high regions. Winter is the season of heavier rains, from November to May.

STRIKING THE COAST

During the fourth night out of Balboa, we cross the Gulf of Guayas, the sea outlet of the Guayas river, the most important water course on the Pacific coast of South America. 70 miles up the estuary is the City of Guayaquil, and in the Gulf the Island of Puna, where Pizzaro fitted his first expedition against the Incas.

On the southern slope of the Gulf lies the little port of Puerto Pizzaro, where Pizzaro first landed on what is now Peruvian soil, and the town of *Tumbez*, the northern most city of Peru. It was founded in 1530.

The *Tumbez* river is the legal boundary between Peru and Ecuador, but it has several times changed its course during the last century.

Cape Blanco is our first landmark. About 7 miles from it are the Organ Hills, the western side of which is said to resemble the pipes of an organ.

IMMENSE OIL FIELDS

10 miles south of Cape Blanco, we pass the oil port of *Lobitos*, which has unusually good oil shipping facilities. An 8-inch pipe line extend along a 3500 feet pier to an artificial island, where tankers take their cargoes and where 10,000 metric tons of oil may be loaded in 24 hours.

If we reach *Talara* 8 miles south of Lobitos before day break, we will see *Talara lights*, one red and one white, visible 8 and 16 miles respectively. They are exhibited 175 and 200 feet above water, from a wooden structure on the north slope of the hill on the west shore of Talara Bay.

Talara is the leading oil port of Peru and, in point of tonnage, its second port.

It is hardly realized that Peru has become the second oil producing of Latin American countries, coming immediately after Mexico. The Peruvian oil fields are mainly exploited by the London and Peru Oil Syndicate and the International Petroleum Co., of Canada—a Standard Oil Subsidiary. The latter was recently reorganized and it has absorbed the Tropical Oil Co., which also had holdings in Peru.

AN UNJUST ATTITUDE

In 1919, these two companies exported practically all their oil without consideration of the needs of the country. The Peruvian Navy had to go abroad to

purchase its fuel oil. The Government brought the oil companies to bay by simply refusing to clear ships from the oil ports, thus practically shutting down the business of the oil companies temporarily.

It is said that it is mainly the attitude of these two companies which has actuated the Bolivian Government in decreeing all oil drilling a national monopoly.

ENTERING A NEW WORLD

Point Parinas, in Lat. 4.45 S. and long. 81.20 W., some 4 miles south of Tarare, is much more than a mere landmark. It is the westernmost point of the South American continent as well as the point of division between two climatic zones. From there, a line may be drawn much less imaginary than the equator or the tropics of Cancer and Capricorn. Theoretically, the tropical zone lies between these two lines, the tropic of Capricorn being just north of Antofagasta, but in fact, tropical temperature ceases, along our course, at about the height of Point Parinas. Were we to sail nearer the coast than we do, the change would be still more apparent, especially as concerns vegetation. Bird and animal life change. We will have no more flying fish and gamboling porpoises, but we shall soon see playful sea lions (lobos) and myriads of Guano birds.

Parinas Light is fixed, visible 16 miles, exhibited 116 feet above water from the western side of the Point.

WHERE IT NEVER RAINS

South of the Gulf of Guayas, as far south as Coquimbo, with a few isolated exceptions, it never, *never rains*. Scientists say that this region has been rainless for the last five or six thousand years. The explanation for the aridness of this region is that the moisture of the northeast trade, which blow from March to September, is condensed while passing over the Andes, while the moisture of the Southwest trades, which blow during the rest of the year is condensed while passing over the cold Humboldt Current.

Hence, these coast lands, varying in width from 20 to 80 miles, are absolutely barren and do not produce a blade of grass without irrigation. Indeed, for many years all coast towns obtained their potable water by distilling sea water. Now, most of them have pipe lines running way into the mountains. It is interesting to remark that the very fact of the aridness of the region has permitted the accumulation of guano and nitrates, so that these barren lands may help fertilizing and producing better crops in seemingly better favored lands.

A REMARKABLE SEA CURRENT

The *Humboldt Current* is the name given to the northern branch of the *Great Antarctic Drift*, which divides itself on the coast of Chile, at about 40° south. It runs almost parallel, and mostly within a few miles

of the coast as far north as Cape Blanco, where it turns west, dividing itself among the Galapagos, and losing itself in the Pacific.

It is the most remarkable of all currents and to the layman it would seem strange that its low temperature, and that of the air about it, remains constant for a course of some 1500 miles with a temperature much below that of waters around it. It is this current, which keeps the temperature along our course much below tropical averages. Several concurring reasons are given as the cause of this constant low temperature, the essential of which is the continual upwelling of deep waters by the current.

A peculiarity of the Humboldt Current is that, in spots, it appears to run in the opposite of its regular northerly direction. This southward flow, while the normal course of the current is northward, cannot be explained either by seasons, age of the moon, or any other causes known by science.

The *tides* along this coast rarely exceed 6 feet in spring tide. Heavy *storms* are exceedingly rare.

THE SOUTHERN SKY

As we near the equator from the north, the first thing unusual—to us—we observe is that the moon, during the first quarter, becomes more and more horizontal, until, under the line, its two ends are on the level. In the Southern Hemisphere, these ends

are turned towards the left and not toward the right as we are accustomed to seeing. At full moon, we will miss the familiar jovial face of Luna and instead behold an indefinite figure which at times has a slight resemblance to a mule head, at others a rabbit.

The southern sky lacks bright and conspicuous figures such as our Big Dipper, Casopeia and others, and the beautiful constellations of Sagitarius and Scorpio are not as often seen in the southern as in the northern Hemisphere.

As a compensation, the southern sky claims the most beautiful and brightest of all fixed stars, Sirius, also known as the Dog Star, which the ancient called Alpha in Canis Major. It is a little more than eight light-years away from our earth, and usually shines like a sparkling diamond.

The southern sky also claims Canopus, which is as bright as Antares in Scorpio. Then, there is Alpha Centauri, the fixed star nearest to the earth, which is only four light-years away, while the nearest star in the northern Hemisphere, Polaris (the north Star) is seven light-years distant.

Moreover, nowhere in the sky are there three stars of first magnitude so close to one another, namely Alpha and Beta Centauri, and Alpha in Cruz (the Southern Cross).

The Southern Cross is at first sight disappointing. It is brighter than the Little Dipper, but not nearly as conspicuous as the Big Dipper.

The Southern Cross is some 25 degrees from the true South. Four of the stars of Carina form a more perfect cross than the Southern Cross and are often mistaken for it.

The Milky Way appears at times in the Southern Hemisphere even more beautiful than in the Northern, and makes it deserve even more the appellation River of Light, or River of the Sparkling Dust. It reminds one strongly that Milton calls it "The Way to God's Eternal Home," and that Longfellow makes Hokomi teach Haiwatha:

The Broad white Road in Heaven
Pathway of the Ghosts, the Shadows
Running straight across Heaven

Probably the most interesting objects of the Southern Sky are the Greater Cloud and the Lesser Cloud, two luminous groups which would form an almost perfect equilateral triangle with the South Polar Star, where there such a star. Early navigators, who noticed them first around the Cape of Good Hope, called them the Cape Clouds, but they were later named the Magellanic Clouds in honor of the famous Portuguese navigator Magellan.

The sky space about these "clouds" is surprisingly void of bright stars as if the cosmical material in that part of the heavens had been swept together and gathered into these two groups.

The origin and composition of the Magellantic clouds and their relation to the stellar universe is an interesting

enigma. Spectroscopic measurements made at the Lick Observatory in Santiago, Chile, indicate that they belong to the 30,000 light-year group, which means that it takes 30,000 years for their light to come to us and that we see them now where and as they were 300 centuries ago. It is further estimated that they move away from us at a speed of 170 miles per second and where are they now? Another interesting feature is that these "clouds" include 2000 or more stars whose light varies, and even entirely disappear periodically.

Are they universes by themselves, and are we viewing stellar groups similar to our solar system, only infinitely bigger and more numerous?

GUANO BIRDS

There is, as far as known, no area of equal extent in the world with as large a seabird population as the stretch of coast between about Point Parinas and Arica. Throughout its entire length, almost always large groups of birds are to be seen. However it is mainly around the Chinchas (see page 115) and the Guanapes (see page 110) that they are most numerous. Sometimes, they may be seen sitting in the water peacefully, innocently, at others marching in long irregular columns, apparently following a leader as if on a military drill.

An interesting series of articles by Robert Cushman Murphy on the bird life of the South American west

coast has appeared in 1920 in the Brooklyn Museum Quarterly, from which the following information was extracted.

Among the various kinds of birds which go to make-up the fauna of the sea surface along the coast, the *Guanay* is the most important. Guany (Guano Bird), is the name which the Quechua Indian gave these birds from time immemorial. It has been said to be the most valuable bird in the world and it has indeed been called the "Billon Dollar Bird." The Guanay is a Shag, or Cormorant, belonging to the white breasted branch of the family and it is probably the most gregarious of all birds. It breeds upon the Islands and the coast in densely concentrated colonies which an English explorer, Coker, has, by careful measurements, estimated to be often much over one million strong within the limits of one single homogenous colony. Another explorer Forbes says that they at times "congregate to the number of ten millions."

The second most important bird of the region is probably the *Alcatraz*, one of the largest pelicans, exceeding in size even the large California member of the family reaching an average weight of 15 pounds. As a guano producer, it has ranked close second to the Guanay, but it appears to have ceded rank to the following:

Piquero, in Spanish, means "lancer." It is the name given to one of the gannets. It is a familiar sight along the whole length of the Humboldt current

for its spectacular plunges into the sea from great heights. The piquero may be recognized by its white body with variagated brown wings and back with bluish bill and feet.

In the Lesser Antilles and along the coast of Venezuela bird egg gathering is carried on systematically and is a profitable business. In Peru, the collecting and selling of any kind of wild bird eggs is very strictly forbidden.

Contrary to what is generally supposed, guano formation is continuous along the Peruvian coast. The largest of the deposits accumulated during many generations of birds are exhausted, but as long as bird life continues to be abundant in these regions, guano will continue to be deposited in many places in commercially interesting quantities.

The fourth day out of Panama, during the early part of the morning, we should cross the small bay of *Paita* with port of that name.

Paita, in Lat. 5.7 S. 479 miles north of Callao is the port for Piura, a city of some 25,000 inhabitants, 97 miles inland by standard guage RR. From Piura, a narrow guage road runs to Catacoes, the center of a "panama" hat industry which rivals with that of Monte Cristi, Ecuador.

Paita has no water supply, and water is brought from the interior in tanks or distilled from sea water. It rains in Paita every eight years once.

Paita is one of the major ports of Peru and one of the three (besides Mollendo and Callao) having bonded

warehouses. In normal times, it ranks third among Peruvian ports in point of value of foreign trade. The harbor is somewhat better protected naturally than the average west coast port.

A RAILROAD DREAM COMING TRUE

If a dream should come true—and it may really become true—Paita may become one of the—if not THE—most important port of the South American West Coast. A native of that little town is the originator of the idea of having fast trains run direct from London to *Dakar* (via Channel tunnel, when built,) the westernmost port of Africa. The trains would cross the Straits of Gibraltar on ferries.

From *Dakar*, 25 knots steamers would cross to Recife (Pernambuco) on the narrowest part of the Atlantic in two days and in a few hours reach *Belem* (Para) and from there sail up the Amazon as far as *Manaos*. From *Manaos*, equally fast but shallow boats would run to a point above Iquitos where the Maranhon river ceases to be navigable. This would be the eastern terminal of a third transandean railway with Pacific terminal at Paita.

Peruvians claim, with some justice, to have absorbed more of French culture than other Spanish American nations, and the avowed purpose of the dreamer of Paita was to bringing his country some two or three

weeks nearer Paris and, in point of time, nearly as near as New York. Incidentally, he thought, this would offset the influence the U. S. A. was bound to gain along the West Coast after the opening of the Panama Canal.

The idea of a third transandean railroad, with terminal at Paita has been since taken up by less prejudiced and more serious minded men. The Peruvian Government is less interested in direct communications with Paris than in bringing its immensely rich Amazon territories nearer the coast. Peruvian engineers have, before the War, surveyed a 450 miles long RR line from Paita to *Calentura*—a point on the Marañon River, where it becomes navigable. The line would cross the Andes at 7000 feet altitude in a 7 kilometres long tunnel. The Peruvian Congress has passed a law granting a subsidy of \$30,000,000 to a company which would construct and operate the line, but the project has remained in abeyance largely because of war and post-war conditions.

As concerns the rest of the line, surveys made by the French Government show that a railroad line from Tanger to Dakar, using the existing trunk lines presents neither engineering nor financial difficulties. Hence it may not be long until Recife (Pernambuco) may be reached from London in five days instead of the present time requirements of two weeks or more.

After crossing Paita Bay, we again sail with the land for some three hours, and then cross the 45 miles wide

Sechura Bay to *Aguja Point*, where the coast takes a sudden turn to the southeast.

Thirty miles further, we pass *Lobos de Tierra* island, where, 323 feet above water, the most powerful light along the coast is exhibited. It is visible 26 miles and shows a group of two short flashes, followed by an eclipse, the whole within 10 seconds.

Thirty miles further, we pass *Lobos de Afuera*, another island whose *light* is exhibited 237 feet above water, showing one flash every ten seconds, visible 23 miles.

Lobos, in Spanish, means seal, and, as their name indicates, these two islands are the playgrounds for multitudes of sea lions.

At about the height of Lobos de Afuera lies the port of *Eten*, 161 miles south of Paita and 313 miles north of Callao. It ranks first in shipment of rice among Peruvian ports and it is only second to Salaverry as regards sugar. A 36 kilometres long railroad line of three feet gauge, opened to traffic as early as 1874, runs to *Chiclayo*, a city of considerable importance. It is operated by the Peruvian Corporation. Another line goes to Cayalti, Lambayeque and further inland. The region is nearly as famous as that of Paita for its "panama" hats. The main town of Eten is two miles from the port, behind a promontory 640 feet high.

Pimentel, 8 miles north of Eten, serves practically the same district. It was at one time one of the important ports of northern Peru, but, owing to a series

of concurring circumstances, its trade has much declined. However, several large sugar estates in the district are being developed and they will, no doubt, give some new trade to Pimentel.

Pacasmayo, 35 miles south of Eten, 290 miles north of Callao serves an interesting rice and sugar district. A 104 miles long railroad of standard guage runs to Calasnique and Chilete. The line touches Cajamarca, the ancient northern capital of the Incas. The ruins of the Great Palace of Atahualpa are in a fair state of preservation.

Near Chilete are situated the most important lead mines of Peru.

Pacasmayo is the only Pacific port through which *Brazilian* products are shipped. Both passenger and freight traffic going by mules from the Hullaga River to the Port.

The town of Pacasmayo, located at the mouth of the Jequetepec River, is one of the neatest of northern Peru. Near-by are the Inca ruins of Pacatnam and also the Yonan rocks covered with hieroglyphic inscriptions presumably much antedating the Inca period.

Malabrigo, 20 miles south of Pacasmayo, as its name indicates, is not well sheltered. However, port facilities were recently terminated and a new railroad line will considerably shorten the distance between sugar estates and Malabrigo compared with via Trujillo Salaverry, so that port will soon gain in importance.

It is yet the principal shipping point for large sugar estates, among which that of *Casa Grande*, which is reported to be the largest in the world. The inhabitants of estate are said to number 14,000. The region of *Casa Grande* was a desert until some one discovered an old Inca—or pre-Inca—irrigation canal which was repaired at little cost and permitted the transformation of this arid region into one of the most productive of Peru, and capable of producing as much sugar as the entire island of Porto Rico.

Huanchaco, formerly important, lost much through the opening of the Trujillo-Salaverry railroad and Trujillo was made the center of a small system of railways.

Just back of Huanchaco is Mount Campana, 3500 feet high.

Salaverry, 66 miles south of Pacasmayo, is hardly more than an open Roadstead, with little protection against the heavy swells prevalent along the coast. Nevertheless, largely thanks to sugar and the intensive agricultural production of the Chicama and Santa Catalina Valleys, it has taken second rank among Peruvian ports in point of value.

Salaverry is also the shipping point for the Montebello gold mine, in the province of Pataz. It is owned by an Argentine Syndicate.

Salaverry is also the port for Trujillo, 12 kilometres away by rail, a short distance from the sea shore a sandy beach. Trujillo was founded by Pizarro, and

named from his native town in Spain. It is the third City of the Republic and the most important place of northern Peru. Its people are said to be among the most aristocratic in their feelings and manners of Peruvian communities and it is proud to be the first Peruvian city to declare its independence from Spain. The province was named La Libertad by Bolivar himself.

VERY EXTENSIVE RUINS

Along the Salaverry-Trujillo railway are very interesting pre-Inca ruins visible from the train. They include what is believed to have been a temple to the sun, a pyramid very unlike Mexican edifices of that kind, but, in structural method—although constructed with huge adobe blocks and not of stone—rather resembling similar Egyptian monuments.

This Pyramid is 800 by 470 feet at the base and 200 feet high. Similarly to the Egyptian pyramids, it was formerly coated with stucco of bright colors. It is quite possible that it has interesting secret interior chambers.

Only three miles from Trujillo, also near the coast, begin the ruins of the famous *Gran Chan Chan*. They are, with what is left of the great ruins around Cuzco, the most curious and the most extensive remains of a race of which little or nothing is known.

These ruins are unique, not merely because of their enormous extent—6 by 12 miles—but by the fact that all buildings were constructed almost exclusively of adobe, without stone masonry, and with very little wood. The sole exception to adobe construction is the great reservoir, of a capacity of one billion 800 million gallons, which is of perfect concrete. Water was obtained many miles inland and carried in an aqueduct across the valley on an embankment 60 feet high. There were also secret underground channels so as to insure water supply in times of war.

AN ANCIENT POTENTATE

The population of the Gran Chan Chan, which was ruled by the *Gran Chimú*, is estimated to have been considerably over half a million. Some estimates go as high as a million and a half. The Gran Chimú ruled over all of Peru, as far south as Callao and Lima. The kingdom was conquered, but not plundered, by the Incas about four generations before the coming of the Spaniards, and the work of destruction of this civilization is by the hand of the white man. The civilization of the subjects of the Chimú was very different from that of the Incas and their predecessors and, from what may be judged from the ruins, they must have attained a high degree of culture.

Not a vestige of tradition has come down to us. We know the title given to their rulers—The Grand

Chimu—but we even ignore how they called themselves.

All designs and ornaments in the ruins of the Gran Chan Chan are original and nothing has been found that would point to foreign influences, except, possibly, the structure of the Pyramid.

Their civilization seems to have developed spontaneously, without or only with little outside contact in the course of many centuries.

THE REMAINDER OF A MIGHTY RACE

Between Salaverry and Trujillo is a little Indian village called Moche whose people differ from other Peruvian Indians. They do not mix with the Quechuans and they retain old traditions and are proud of their ancient lineage. Presumably, they are the only pure remains of the formerly great Chimu nation.

At about 8.30 latitude S., we pass the Guanapes, a group of islets which are the play grounds for thousands of sea lions. On the highest, near the south end of the group, a light visible 23 miles, showing three short flashes followed by a longer eclipse every 10 seconds, is exhibited from a tower 454 feet above water.

TWO WONDERFUL BAYS

Some 35 miles south of these islets, 210 miles north of Callao, lies the port of *Chimbote*, which has been called the port of the future. At present, it is merely

the main outlet for the Santa River Valley, but it has an agriculturally and minerially very rich hinter-land. It is the shipping point for the estates of the Peruvian Sugar Co. and of Tambo Real.

Chimbote has the advantage of a landlocked bay, well protected by Blanco Island and by the Ferrol islets. Its area is 36 square miles without a single submerged rock that could render navigation dangerous. A railroad runs from Chimbote up the picturesque Huailas valley, to near the foot of the Huascarán, 21,822 feet high. This was first ascended by Miss Annie Peck, of New York.

A few miles north of Chimbote is a small settlement on Santa Bay, near the outlet of Santa River, the only inter-Andes stream flowing into the Pacific. It would be in part navigable and the largest river on the west coast of South America, were not its waters all taken up by irrigation long before they could reach the coast.

RUMORS OF AMERICAN NAVAL BASE

Samanco, 10 miles south of Chimbote, shares with the latter the advantage of being on one of the best natural harbors on the west coast. It is so deep that vessels may anchor to within a few yards from shore and its waters always so placid that they have been likened to those of a lake. According to newspaper reports, a few years ago, the U. S. Government had

offered to buy the bay for a *U. S. Naval Base*. Samanco is merely the shipping point for sugar and cotton estates, small quantities of silver are also shipped.

In about 10.30 lat. S. we may see near shore the Pisco de Pativilca, in English Mt. Darwin, a cone 5880 feet high. A little to the south and more inland, another distinctive landmark, *Mt. Osborne* is 8060 feet high.

Huarmey, the shipping point for the Anglo-French Tica Pampa silver mines, served by a short narrow guage railroad. Some salpeter is also shipped from Huarmey.

The town, two miles from the port, is in an oasis surrounded by a sandy desert.

Supe, a minor port at the mouth of the Rio Pativilca, is 90 miles north of Callao, on a snug little bay which cannot well accommodate large vessels. Two narrow guage railroads connect sugar and cotton estates with the port.

Huacho, 70 miles north of Callao, and connected with Lima by rail, was formerly a rather important guano port, but now serves mainly as outlet for sugar and cotton estates. Some of the longest staple cotton is produced in the region. The town of Huacho has some 15,000 inhabitants. Important deposits of coal and other minerals have been proved in the district and interesting developments are hoped for.

Some 50 miles north of Callao, we pass the *Haura* Islands a 14 miles long string of islets located west of

Point Salinas. On one of them, Mazorca, a *light* visible 25 miles, flashing once every 5 seconds, is exhibited 300 feet above water.

Chancay, 40 m. N. of Callao, connected by rail with Lima, and with Palpa, Huacho and Huara in the interior, is a sugar and cotton port.

PERUVIAN COAST SOUTH OF CALLAO

Only few landmarks along that coast are worth mentioning. Everywhere, we see the same barrenness. Houses may be seen on some isolated spots, but they are abandoned shacks of former guano workers.

About 30 miles south of Callao, lies the small port of *Chilca*, frequented only by coastwise sailing vessels. However, the district has been found sufficiently important to construct a railroad to that port which will be terminated in 1921.

Cerro Azul, 72 miles south of Callao, serves the fertile valley of the Canete, beginning five miles from the port, which produces long staple cotton and sugar, as well as rum and by-products.

Tambo de Mora, 25 miles south of Cerro Azul, 15 miles north of Pisco, at the mouth of the Chincha River, serves the Chincha valley which is said to be one of the most fertile of Peru, producing long staple cotton, sugar and wine grapes. It is claimed that this region is the nearest to the equator where wine of really good quality is produced in large quantities.

CENTERS OF VITICULTURE

Pisco, the principal port between Callao and Mollendo, on Pisco Bay, formed by the Paracas Peninsula in the south and protected by the Chincha islands in the west, is 111 miles south of Callao. It serves a fertile hinterland which is also minerally rich and it is the only port of Peru besides Callao from which appreciable quantities of gold are exported. The development of the interior has been somewhat retarded by the fact that, in spite of the formation of the bay, Pisco is not at all times a good harbor. The "paracas" winds blowing from the direction of the peninsula of that name come in sudden gusts and for a good many days in the year, the working of cargo in the afternoon is difficult and at times impossible.

The railroad from Pisco serves the three departments of Ica, Ayacucho and Huancavelica.

Ica, 74 kilometres inland is a city of 12,000 inhabitants. It is a rather important center of viticulture and where the white rum, known as "pisco" all over Peru and also in Bolivia, is made. In the district are mineral waters of proven curative value.

Pisco is also the port for Huancavelica and Ayacucho both some 200 miles inland. The latter is renowned for fine filigree work made there, nearly as much as for the peace signed there with Spain, confirming the independence of Peru, Bolivia, Ecuador and Chile.

FAMOUS GUANO ISLANDS

West, slightly to the north of Pisco are the *Chincha Islands*, a cluster of peculiarly shaped islets which, some years ago, were great producers of *guano*. A little over an hour later, we pass *St. Gallan Island*, which appears as if it were part of the mainland. An hour and a half afterwards, we may distinguish the shape of Mt. Wilson, rising almost abruptly from the sea, and a short way further, Mt. Caretas, 1400 feet high appears, forming the northern protection for Independence Bay, partly closed in the south by Vieja Island, (elevation 200 feet) followed immediately by Santa Rosas islets. A few miles north of Mount Caretas. we may notice the flat topped Mt. Zarate. The only settlement in Independence Bay is the small fishing village of Tungo. Immediately south of Independence Bay, the form of Mt. Quemado (2070 feet) appears.

The next landmark, less than two hours later, is Dona Maria Point and, immediately west of it, are Los Infernillos (the little hell), a cluster of rocky islets. A few miles south, we have, at 2160 feet altitude, a curiously flat topped elevation called the Table of Dona Maria.

The next important port is Mollendo, but north of it are the little ports of *Lomas* and *Chala*. The latter is the nearest port to Cuzco by the land route, and in spite of the railroad with terminal in Mollendo, this route is still used by Indians.

Islay, 5 miles north of Mollendo, was the principal port of the province, until the railroad to Arequipa and hence to the Altiplano, was opened. It has since been deserted and all its inhabitants moved to Mollendo. Islay would make a much better port than Mollendo, and if the railroad was extended that far, trade would quickly revive.

POSSIBLE ABANDONMENT OF MOLLENDO

Mollendo serves as port for *Arequipa*, the second city of Peru, and for the vast, but not very fertile Peruvian Altiplano. It is also the port for the nearby Tambo Valley, which is one of the richest in Peru and the first to produce sugar on a large scale. The railroad line to Arequipa, and hence to Juliaca, with branch to Puno, connecting with steamers on Lake Titicaca for the Bolivian side of the lake and La Paz, and another branch to Cuzco, is operated by the Southern Railways of Peru, a subsidiary of the Peruvian Corporation. Its general Manager is L. A. Blaisdell, an American. From Cuzco, the old Inca Capital, the line is being extended toward Santa Ana, on the Amazon side of the Andes. Between Cuzco and Puno, at Vilcanota are the source of two rivers, within one mile of one another. One of them, the Vilcanota becomes a tributary of the Amazon, while the Tambo River would empty in the Pacific, were not its waters all taken up for irrigation. The President of the

National University at Cuzco, is an American, Dr. A. Giesecke. He has been twice Mayor of the City of Cuzco.

Mollendo is one of the worse ports on the west coast, and it has been a question more than once to move its trade back to Islay, or, two miles nearer, to *Matarani Cove*, where there is deep water very near the land and a port could be made at small cost.

Mollendo obtains its water supply from Tingo, near Arequipa.

Ilo is the most southerly port of Peru, 75 miles southeast of Mollendo. A 100 kilometres long railroad line runs to Moquega. It traverses a district which produces grapes and olive oil, The Government has fostered the wine industry by importing cuttings of suitable varieties from France and employing French instructors.

The Moquega railroad was built with the idea of extending it to Lake Titicaca and to make Ilo a port for Bolivia. Ilo is famous in Peru for its white candy called "dulce de leche" (sweets of milk).

Some 70 miles southeast of Ilo, we will leave the Peruvian coast and then sail with the coast of Chile.

CHAPTER VIII

THE CITY OF KINGS

Lima, the capital and largest city of Peru, was founded by Pizarro and called by him "Ciudad de los Reyes" (the City of Kings). Later, Colonial Vice-roys gave her the name of "Tres Veces Coronada Ciudad de los Vireyes" (three times crowned city of the vice-roys). Lima—presumably a corruption of Rimac—was first a surname, and subsequently the name given to the City by the Republic.

Lima is located 7 miles from Callao, at 500 feet altitude, in a fertile plain formed by the lower valley of the Rimac at the westernmost spur of the Andes. It is surrounded by mountains of a moderate height, the most conspicuous and nearest of which is the Cerro de San Cristobal.

Callao is connected with Lima by both trolley (every 10 minutes) and train (every 30 minutes), and is the terminal of the Central Railway system.

The center of Lima, the Plaza Mayor, on which the Cathedral and the Presidential offices front, is one of the beautiful squares of South America. The Cathedral

is said to be the most beautiful church edifice in Latin-American countries. The corner stone was laid by Pizarro, who also founded San Marcos University, the oldest institution of higher learning in the Americas.

HISTORICAL RESIDENCE

Next to the Cathedral, the oldest existing building in Lima, and probably in the Western Hemisphere, is the former residence of the family Torre Tagle, on Calle San Pedro, which has been purchased from the family Torre Tagle to be preserved as a national monument and is temporarily used by the Foreign Office. The Church of San Francisco, two blocks from the Desemparados railway station, is also a beautiful edifice dating from Spanish times, and the visitor who will take the trouble to take a stroll through old Lima's streets outside of the path beaten by tourists and sight-seeing automobiles, will be amply rewarded by many interesting architectural finds.

STYLES OF ARCHITECTURE

The prevailing style of architecture in churches and the older public and private buildings is Spanish renaissance (locally called Colonial Style) modified by the requirements of climate. But among Lima's older streets, and even on the Plaza Mayor, are found arcades, with closed galleries above, and overhanging

balconies which, though different in many ways, remind one of Tunis and Cairo, and even of Rangoon and Calcutta.

The architecture of modern monumental buildings and private residences has been decidedly influenced by the Italian love of intricacy of lines and has been characterized by most writers as Greco-Roman. New residences in the suburbs present an even greater variety of design than similar suburbs in the United States.

One of the characteristics of old Spanish construction were elaborate woodcarvings of doors, ceilings and balconies, several examples of the latter being seen on Lima's streets. There are also several notable examples of beautiful stone carvings on church facades.

INTERESTING RUINS

There are a number of Inca and pre-Inca ruins in the immediate vicinity of Lima, practically all of them of huge adobe block construction. Some of them are easily accessible. The nearest are in the vicinity of La Legua (the trolley station midway between Callao and Lima). Beyond two artificial hills towards the south are the largest ruins near Lima. They may be reached in less than half an hour walk and the commissary of police of La Legua usually allows a soldier to act as guide to strangers.

The most important ruins near Lima are those of

Pachacamac, on the right bank of the river Lurin, 19 miles south of Lima. There, Pachautec, the 10th Inca built one of the richest palaces of his empire. These ruins are smaller in extent, but are said by some visitors to be more interesting than those of the Gran Chan Chan.

A PLEA FOR FAIRNESS

The casual visitor to Lima, who, of course, barely sees the surface of things, is very likely to form a wrong judgment of Lima, and the Limenians. He may see there merely a materially enlarged, but intellectually impoverished capital city of the American southwest, dethroned from her regal supremacy, having lost her colonial stamp, disfigured—rather than embellished, by modern outlandish edifices, and marred by many seeming instances of decay and neglect.

However, were the stranger to see more deeply; were he able to live for a time true Limenian life, which, in many ways, has remained more "colonial" than mere appearances disclose, he would form a different opinion of Lima.

All that the stranger sees of Limenian life is bullfights, horse races, sports and occasionally an opera poster, as well as some poor imitation of what is called Parisian gay life. The stranger does not see, and does not know, that probably nowhere in the Western Hemisphere, one finds, especially in the family circle, greater in-

terest in philosophy, in sciences, in literature and in arts. Lima certainly equals Bogota and Popayan, and probably surpasses Caracas in intellectual life.

Lima cannot become a modern city in the sense of Buenos Ayres, Montevideo or Santiago without giving up what is dearest to her sons. It wants to remain the "City of Kings" as far as compatible with the needs of its modern inhabitants.

This should be remembered by tourists before expressing a judgment upon Lima.

JUST A PORT TOWN

Callao was formerly called down town Lima, but its stores have been replaced by commonplace shipping offices and the first impression the stranger obtains from the city is not very favorable. Being merely a port town, whose inhabitants are nearly all port workers, clerks or officials and without any wealthy class, one should not expect Callao to be beautiful.

Nevertheless, Callao has two really good public squares, one right in the midst of port warehouses, the other in the center of shipping offices. It also has a beautiful avenue of stately old trees which would be the pride of any city, even in countries blessed by rains.

20 minutes by trolley from Callao is the watering place of La Punta, on a small peninsula facing the Island of San Lorenzo.

During the early Spanish times, Callao was often subjected to attacks of Pirates. In 1746, an earthquake destroyed the town and practically all its inhabitants perished. Similarly to Port Royal, Jamaica. the former town is now submerged. The present city lies to the north of the old one. The last earthquake happened in 1876.

AN OLD SPANISH CITY

Arequipa 110 miles from the port of Mollendo by rail, on the floor of a fertile valley 7500 feet above sea level, has nearly, 100,000 inhabitants and is the second city of Peru. It has retained even more of old Spanish characteristics than Lima, though in a less pretentious way. It is renowned for its pleasant living conditions, its equable climate, and the agreeable commerce, the courtesy and the hospitality of its people.

One of the most beautiful sights in South America is the Gran Misti of Arequipa, an active volcano, almost a perfect, perpetually snowcapped cone whose awful grandeur reminds one of Fujijama. It is 20,320 feet high. Its last eruption was in 1839.

The wonderfully clear atmosphere of Arequipa and large number of clear days and nights has lead to its selection by Harvard University as the site of its astronomical observatory for the mapping of the sky of the Southern Hemisphere.

THE INCA CAPITAL

Cuzco is intensely interesting for what it was rather than for what it is. Modern Cuzco is quaint, curious, original, but its ancient glory has gone infinitely more thoroughly than that of Lima. However, no region in the Western Hemisphere includes remnants of ancient civilization of such an extent or of greater interest.

Near Cuzco are the ruins of the fortress of Sacsahuaman, constructed of huge stone blocks, brought from mountains across a deep valley, some of which measure as much as 36 feet on each side. There are the remarkable ruins of Ollantaytambo and Machu Picu which may be reached in 3. to 5 days on horse back, and in many places in that region one may gaze with amazement upon agriculture and irrigation carried almost to mountain summits. Even when one has been overawed by the Great Pyramids, the Sphinx and the ruins of Memphis and of Thebes, these works appear small when compared with what ancient Peruvians have achieved.

A WORLD BY ITSELF

One cannot speak of *Iquitos* merely as of an inland city, as of Arequipa or Cuzco; it is much more than than other places the heart, one might almost say the concentrated essence of the Loreto Province of which

it is the center. It is 2,500 miles up the Amazon. Like Manaus, some 1500 miles downstream, it is a city well started and never finished. It began to grow nobly and luxuriously, when the bottom dropped off the prices of "Para" rubber and its dream of becoming a gem of modern civilization in the midst of the jungle was stopped short.

Now, Iquitos appears to be sleeping and indifferent to its fate. Some of its main streets are allowed to grow sufficient grass to render their use as pasture possible, but Iquitos does hope. It realizes that it is the hub of a region enormously rich which in the not distant future will be developed with the aid of foreign capital and technical knowledge.

At one time Iquitos had 40,000 inhabitants, but now it has less than half that number. It has practically no economic relations with the rest of Peru and the only means of communication with other parts of the country is wireless telegraphy which sometimes fails. It would be another country were it not for officials sent from Lima and deputies and senators sent to Lima for the sessions of the National Congress.

CHAPTER VIII

AGRICULTURE

Humboldt spoke of Peru as a beggar sitting on a gold hill. This is decidedly unfair to modern Peruvians who have developed a considerable proportion the wealth of the country. But it characterizes the enormous richness of their land and the hugeness of its natural resources compared with the small proportion thus far developed.

Comparatively little is known of the agriculture of Peru in the United States. The "man on the street" barely knows that some sugar and some cotton are exported from the land of the Incas in addition to some beans which are supposed to come from Lima but don't.

The fact is that Peruvians have domesticated and rendered useful to man a greater number of varieties of plants than any other people in America.

Moreover, nowhere in the known world has agricultural practice been carried in as intensified a manner as in the Altiplano which, at the time of the Incas and

probably also before, was the most populated part of the Western Hemisphere. There, terracing and irrigation were practiced to as near the summits of the mountains as temperature permitted, and irrigation methods were such that modern technicians fail to see how they could be improved. Plant adaptation was brought about in a manner unexcelled elsewhere.

To this day, *corn* in Peru is grown at sea level and as high up as the banks of Lake Titicaca, at 13,000 and even higher altitudes. The Cuzco corn, grown in a similar altitude, but a different region, is famous for the size of its grains, equalling the famous Brazilian "rosa. *Potatoes* are native of the high Andes valleys, but they are grown near the sea shore as well as in the Aroya region, between 13 and 15,000 feet altitude. In no other country are *wine grapes* successfully grown commercially on as large a scale as near the equator as in some of the valleys south of Lima.

Cotton, one of the three greatest staples of the United States broke all records in Peru. In the Canete valley, south of Lima, accurate weighings have shown an average production of 533 pounds per acre, some fields ranging as high as 968 pounds per acre. Near Lambayeque, in the north of Peru, one district has reached the very high maximum average of 1,384 pounds per acre, compared with a high average in our southern States of 300 pounds per acre.

Cotton is a plant native of Peru and Pizzaro found cotton fabrics in tombs which much antedate those of

the Incas. The best grades are grown in the region of Piura and shipped from Paita, the length of the fiber coming near that of the longest Egyptian cotton. The high quality of the Piura cotton is attributed to peculiarities of soil and climatic conditions.

If we take into consideration the comparative newness of the industry, Peru is one of the leading *cane sugar* producing countries. The region of which Trujillo is the center, produces nearly as much sugar as the entire island of Porto Rico.

Rice has also received considerable attention, especially in the northern part of the country and a large proportion of domestic requirements are produced there. The varieties planted are Carolina and Jamaica.

An attempt is being made by a company of Lima business men to grow *tea* and *spices* on an estate near Tumbez.

The *sheep* industry of the highlands of Peru is important, and there are in various parts of the country great opportunities for *meat production*.

IMMIGRATION

What Peru lacks is immigrants. It is one of the two or three South American countries where the tide of European immigration has not yet set strongly. Unlike other South American countries, which look to Southern Europe for immigrants, and to a smaller extent to Germany, Peru has, in 1920, endeavored to

bring about a large British immigration. Free passage and unusual inducements were offered to suitable persons, both agriculturists and artisans. Unfortunately, without explanation, the British government requested Peru to discontinue propaganda work in Great Britain.

The immigration problem in Peru presents unusual difficulties. The agricultural laborer type of immigrant which goes to River Plate countries seems unsuited here. The Germans are not wanted in Peru in large number. Moreover, they come to Peru as traders, not as workers, and developers.

The only considerable immigration expected at present is Japanese. A Tokio company has acquired 740,000 acres of jungle land along the right bank of the Huallaga River. The avowed purpose of the purchase is the exploitation of the tract of land and of the region as concerns medicinal and other plants, but it is known that a huge colonization scheme is contemplated.

A DIFFERENT POINT OF VIEW

It is well to state here, to show the great difference between the North and the South American point of view concerning development of a country, that considerable immigration in Peru is opposed by many influential men. They realize that a large white immigration would improve the land wonderfully and make Peru the richest country on earth. On the other

hand, they inquire, would it make its inhabitants more happy?

The Indian who now does pretty well what he pleases and has few needs would finally be forced to work regularly for the white man. He would develop new needs at the expense of his present happy indifference.

AGRICULTURAL PROBLEMS

The most productive part of Peru are oasis-like valleys formed at intervals in the desert wastes between the Western Cordillera and the sea, and irrigated by rivers and mountain streams. The soil in these valleys was formed of alluvion washed down the mountain sides at the time when it still rained in the zone. Naturally, depth and character of the soil and fertility depend very much, according to distance of the mountains from the valleys, steepness of the land and whether or not the mountainside was wooded.

As a rule, these alluvian deposits are richer in nitrogen than in potassium, and in phosphorus. This stimulates herbaceous growth, but not blooming and fruiting, and in spite of the comparative richness of the soil, mineral fertilizers have frequently to be employed to induce quicker maturity of the crops.

The area of land which could become productive by irrigation and for which water is available has been computed at upward of 50 million acres. Large projects are pending, only one of which is actually being

executed, namely that of the Imperial Valley. Another project, for which Martinelli Bros. of Lima have a concession, is the irrigation of 20,000 acres of virgin lands in the Arequipa district. The Peruvian Corporation has also various irrigation concessions mainly in the northern provinces.

MINING

If there is a lesson to be learned from the history of mining in Peru, it is of the instability of this world's riches. For the sake of gold, great civilizations were destroyed, and a vast and densely populated territory almost bared of its inhabitants, and now the country which in gold richness probably equals Judea in the time of Solomon has sunk to almost insignificance as a producer and possessor of gold.

The mineral wealth of Peru is proverbial and it has often been documented by experts. Among them, Raimondi, who probably made the most complete survey of the mineral resources of the Republic, says: "Peru is without doubt one of the richest mineral countries and the variety and abundance of the minerals found in its territory are indeed amazing."

Bolivia and also Colombia, it is true, claim still greater mineral wealth, but even if these claims were true, Peru possesses advantages and possibilities of development which do not appear to be present in the same measure in these countries.

STRANGE REVERSAL OF CONDITIONS

Before and during the early days of the Spanish Conquest, the mining of *precious metals* was carried on in an extensive scale and the accumulated reserves must have been immense. The quantities of gold and silver shipped from Peru to Spain have probably never been exceeded by any country.

Then follows a long period of stagnation, during which practically no mining of gold and silver took place, until, in 1903, mining operations for various minerals began almost simultaneously in various parts of the country. Since then, progressive development has been rapid, but while in the early days gold and silver were, in addition to some copper, the only metals mined for, little of these are mined now and what is produced is mostly as the by-product of copper smelting.

There is something strange in the almost complete disappearance of direct gold mining in Peru. Some of the old Spanish mines may have become exhausted, but from what is known of the geology of gold, what has been dug out of the ground must be only a very small fraction of what remains. Hence the almost complete cessation of gold mining is to say the least unexplainable.

Peru ranks only 16th among gold dredging countries and about 70% of the gold mined as such comes from the department of Puno, near Lake Titicaca, at over

12,000 feet altitude. The Santo Domingo mine, located there, has produced several million dollars in gold. It is owned and operated by an Argentine syndicate, which also controls the Montebello Mine in the Department La Libertad, near Trujillo, northern Peru.

Native gold is produced only on the Amazon side of the Andes and shipped via Iquitos. In 1920, large finds were made in the bed of the Napo River and they are said to be investigated by the Gold Consolidated, Ltd., which is probably the largest gold mining concern in the world.

Gold mining is taxed 10 Peruvian pounds (nominally \$50) per kilo in dust, or bar, and 2 pounds per kilo when obtained as a by-product.

PERU, SECOND OIL EXPORTING COUNTRY

Petroleum is fast becoming to the modern conquerors of Peru—British and American capitalists—what gold was to the Spanish Conquistadores. Indeed, as concerns exports of crude oil and some petroleum products, Peru has already surpassed the United States and has taken second rank—immediately after Mexico—as an exporter.

Petroleum has been known to exist in Peru for 200 years, and already in prehistoric times the “brea” (pitch) found at places where seepages occurred and

the lighter products had evaporated, was used by ancient Peruvians and is still used by natives to line earthen vessels used to contain liquids.

However, it is only during the last fifteen years that development on a large scale has begun. Exploitation was not as easy as in other oil regions. The oil is found mainly in the arid north and the complete absence of potable water and the unproductivity of the country around has added much to the expense. Moreover, there has, from the beginning, prevailed in Peru—rightly or wrongly—a sentiment rather hostile towards large foreign oil interests which has not contributed to greater development.

The petroleum possibilities of Peru have been grouped into two general regions, namely, the North Pacific coast, which is subdivided into the Zorritos, Lobitos and the Negritos fields. The second region is the Andean, with proven fields near Puno, not far from Lake Titicaca, at 1,250 feet altitude, with various as yet indefinite possibilities at various altitudes between that region and the first.

The Andean fields are not worked.

The oil of the northern fields is from tertiary formation, of a mixed asphaltic and parafin base, of good quality, though not equal to Pennsylvania oil.

Peruvian law provides two classes of oil concessions, one for the exploration of unproven areas, the other for the exploitation of proven ones. Concessions are examined and granted with a view to actual operations

and propositions of persons of speculative tendencies are not encouraged.

A sliding tax is imposed upon oil, and its producers at all times have protested it as too heavy, but it has been maintained.

Copper—although the quantity produced is much less than that of Chile—is by far the most important mineral mined in Peru at present, and, during the last few years until 1920, the exports have continually been on the increase.

The most important copper mining concern of the country is the famous Cerro de Pasco Mining Company, an American corporation, whose property and smelter are located about 130 miles from Lima, on the Lima and Oroya railroad, at the junction of the west and east cordilleras. The visible ore reserves of this property is said to exceed 3 million tons which figure may be exceeded following further development work. The property includes coal mines, the product of which, however, is of inferior quality and has to be treated before its availability as fuel. The Company is capitalized at \$10,000,000.

The second important copper mining concern is controlled by the British Banking House of Backus & Johnston, with mines at Casapalca, the third, under Cerro de pasco control, and 100 miles from the former, is the Morococha mine. There are several less important copper plants in other parts of the country.

Peru possesses more visible *Vanadium Ore*, than the rest of the world combined, and the Peruvian production of that metal covers over two-thirds of the world consumption.

For several years after its discovery, vanadium was considered as mere laboratory curiosity. Later it was used in the dyeing of certain weaves, in the decorating of chinaware and in the manufacture of certain kinds of glass to which it gives a crystal appearance, and greater elasticity.

It is also used in the preparation of the zinc plates now used in lithography in place of stones, but its principal use is as a ferrous alloy. Even when added in very small quantities (as little as four pounds to the ton) vanadium gives to steel greater strength and ductibility as well as an increased power to resist shocks and the effect of vibration and friction, hence the extensive use of vanadium steel in the manufacture of tools.

A NEAR ROMANCE

The main Peruvian Vanadium deposits are located in the Junin department at Mina Ragra, at 16,500 feet altitude or some three miles up to the sky. They were known by the owner of mining claims, a native Peruvian, but brought to light in the outside world through James J. Flannery, of Pittsburgh.

Mr. Flannery took a trip to Peru for the purpose of acquiring the Vanadium property. All the capital he could gather together was \$20,000. That wasn't much, and that was only a fraction of what was asked for the mine. But Mr. Flannery knew the value of the sight of a heap of gold, compared with sheets of paper with promises to pay later. He secured glittering gold pieces for the full amount of the investment he was able to make, and, at the psychological moment, while negotiating with the owner, flung the gold upon the table.

The story goes that the scheme worked, and that the owner promised to sell for the pile of gold before him. While the papers were drafted, a cable came from an English syndicate offering \$200,000, but the Peruvian, Mr. Fernandani, kept his word. He was later rewarded by Flannery with a substantial block of stock, now worth a big fortune, in the company he organized.

The mines are controlled by the Vanadium Corporation of America, in New York.

OTHER INTERESTING MINERALS

Peru furnishes 80% of the total world production of *molybdenum*, one of the rarer minerals. It is found in small deposits in various parts of the Sierra, but the deposits of Ricran, in the Jauja district, department of Junin are considered of the greater importance.

For a number of years the use of molybdenum was confined to laboratory practice, as ammonium molybdate, in phosphorus analyses. Now, its compounds are used as dyeing agents for ceramics and silks, in the manufacture of gun powder, and as a steel alloy which it hardens without impairing its malleability. Hence its use for tool and wire steel.

The superior quality of the *tungsten ores* of Peru has often been commented upon, yet, as a producer, Peru never has exceeded the third rank among South American countries. Two of the deposits are claimed to be the largest in the world, namely that of Cuzco and that on both sides of the river Pelagatos separating the Provinces of Chuco and Pallasca. Curiously, the third important Peruvian deposits, those of the Cerro Julcani were worked for many years until 1916, however not for the sake of tungsten, but for the gold that the ores contain.

Peruvian tungsten, as a rule, occurs in the form of concentrates whose yield varies from 50 to 70%.

Silver is found in many sections of the Peruvian Andes, both alone and associated with other metals, especially with copper and lead. "Cascajo" is a silver-bearing ore, mined on a large scale in the Cerro de Pasco district, which is peculiar to Peru.

Probably the most important silver mine of the country is the Anglo-French Ticapampa Silver Company, near the small port of Huarmay, between Samanco and Supe. The Caylloma silver mines in the

Department of the Arequipa, were very famous at one time. They were worked under the Incas for several generations, but it is only in 1630 that the Spaniards discovered their location. Judging from old Tax books still preserved, the annual production must have exceeded one million ounces—as much as the total production of the country at present.

Mercury, as cinabar, is found near Huancavelica, also near Chonta, Dos de Mayo and Puno.

The production of Peru in *lead and zinc* has, thus far, been negligible, but vast deposits of these are known to exist near Chilete, Yauli, Huarochiri, Pallasca and Huari.

Nickel and Cobalt have been proven, (but they are not mined) in the provinces of Lamar and Conception.

Antimony is found in Yauli and Huancavelica and this metal has been mined on a small scale during the war, but the deposits are not worked at present.

Owing to the dry atmosphere and absence of rain on the Peruvian coast, various kinds of mineral salts have accumulated there in considerable quantities. Among these are *nitrates, magnesia, alumogen, sodium sulphite*, etc. *Sodium chloride* (common salt) is found in deposits not only near the coast but as far inland and at as high altitudes as that of Cuzco.

Sulphur exists in great abundance in proximity of several volcanoes, but the Department of Piura is the only important producer at present. A plant of 150 tons daily capacity is in partial operation there.

Borax deposits are known to exist in Arequipa, Moquega, Tacna and Camana, but the only deposits exploited at present are those of Salinas, between Arequipa and Moquega. They are controlled by Borax Consolidated, Ltd., which has practically a monopoly of world Borax production and sale.

Beds of *Graphite* exist and at one time were exploited on a small scale in the Department of La Libertad,

Large deposits of *Potassium Carbonate* were recently discovered in the Jauja Valley.

Thus far, little has been heard of the *Iron Ore* deposits of Peru, but outcroppings of both magnetic and hematite ore are met with in many parts of the country. The best known deposits are located in the Departments of Piura, Calca and Larez, where magnetic ore is claimed to have analyzed as much as 80% metallic iron.

Marbles, gypsum, kaolin, ochres and some of the *rare earths* have been located but have not yet been made the object of any industry.

Mica deposits are worked in Ouanacharca, province of Camana, where both geological and industrial conditions are favorable for their exploitation. The whole output of the mine is shipped to the United States.

Guano, once the most important item of export in Peru, is not any longer a source of considerable revenue to its Government. The deposits are far from exhausted, but a series of concurring factors has les-

sened the importance of the industry of guano gathering and shipping.

For a time, the Peruvian Corporation was the only important guano concessionaire and it has shipped two-thirds of its original contract giving it three million tons. A new agreement has been entered into between the Peruvian Corporation and the Peruvian Government in 1921.

The second important guano concern was German, but it is not operating its concession at present.

The domestic requirements in guano supplied by the Compañia Administradora, a government institution, which controls all deposits south of Callao and north of the Chincha islands.

Guano is analyzed before shipment and sold upon a base price according to its value as a fertilizer.

PERUVIAN COAL PROSPECTS

Although vast deposits of coal are known to extend along the crest of the Western Cordillera, spreading from the south towards the extreme north of the country, branching out in the region of Huancavelica both towards the coast and towards the interior, Peru is still a large importer of coal, mainly from Chile and from the United States.

Some of the largest known Peruvian deposits are easily workable, but production has been thus far

limited to exploitation on a comparatively small scale by copper mining interests.

Industrial exploitation has remained impracticable largely because of lack of transportation facilities and of capital.

Peruvian coal is in the main of the Cretaceous age, and primarily lignite and sub-bituminous. However, high grade bituminous and anthracite coal fields have been located.

The coal measures are of variable size and so distributed that practically every department is known to possess interesting reserves. Two Government Commissions are now looking into possibilities of development. One is studying the soft coals of the Oyon region the other the anthracite fields of the Santa Valley.

In 1919, a syndicate of Lima capitalists was formed which intends to work the Hunaiday fields in La Libertad province. With Government aid, a 70 km. long road is being made in such a way that it will later serve as road bed for a railway. This line will ultimately be connected by rail either with Malabrigo or with a new port to be made for Ascope. The total cost of the project, including that of facilities to mine 500 tons daily, are estimated at less than half a million dollars.

A bill recently passed by the Peruvian Congress allows the Government to contract with the Banco Italiano of Lima for a loan of three million soles (1½ million dollars) for the construction of a railroad connect-

ing the Jahunhuasi coal fields with some stations of the Peruvian Central Railways.

A system of aerial cable transportation to these fields is also projected.

THE LAWS ARE LIBERAL

The *Mining Laws* of Peru are most liberal and intended to facilitate development. They make no distinction of nationality and foreigners have the same rights as Peruvians. Equality is carried so far that in the local councils of mining districts miners elect their own representatives, foreigners being both electors and eligible.

The usual dimensions of mining claims, or "Pertenencias" is 100 by 200 metres, a maximum of 70 Pertenencias, or less, constituting a grant or concession.

However, the acquisition of several grants in close proximity to one another is permitted under certain conditions.

The only title necessary to obtain and retain Government mining property is a tax of 15 soles (about 7½ dollars) every six months on each pertenencia. Gold and silver are the only two metals on which an export tax is levied, and the only restrictions to mining are as concerns guano, borax, and similar salts which are subject to special laws.

RAILROADS

The topography of Peru is such that the creation of a railroad system radiating toward an important center presents greater difficulties than in other countries also cut up by mountains, such as Colombia and Venezuela. The impenetrability of the Andes—except at prohibitive expense—is directly responsible for the seeming backwardness of Peru as concerns railroads.

Indirectly, development has also been retarded by the fact that by far the majority of the people of the country are Indians who produce practically nothing beyond their wants.

The railroads of Peru all start from the sea, slowly pushing their way across the coastal belt, extensions being built as conditions require and at the same time permit. Only two of the Peruvian railroads cross the mountain barriers. The Central, from Lima to Aroya and Cerro de Pasco, with other branches to Huancayo and to Morococha, reaches an altitude of 15,665 feet at the tunnel of Galera, on the main line and 15,865 feet on one point of the Morococha Branch. It is by far the highest railroad in the world, exceeding by nearly 3,000 feet the highest Swiss mountain railroad. Including the Ancon-Lima Branch, the system is 384 miles long.

The Southern railways run from Mollendo to Juliaca, via Arequipa. The branch completed to Cuzco is

being extended toward Santa Ana on the Amazon side of the Andes. A short branch runs from Juliaca to Puno, connecting with lines of steamers operated by the same company on Lake Titicaca. The length of the system is 864 miles, standard gauge.

Both of these systems, as well as a number of transversal lines, are Government owned, but operated by the Peruvian corporation.

In a general way, the railroads of Peru run west to east and practically all railroad projects follow the same direction. Longitudinal railroads are not likely to pay any better in Peru than anywhere else on the South American continent and the idea of building lines which would become parts of the North American idea of a Pan-American railroad is not any more seriously considered in Peru.

Each valleys, in seeking an exit to the sea, has chosen the most likely route and the cheapest means of reaching it without thought of a national railroad system. This explains the variety of gauges and of methods of construction and operation, each line being purely regional. Cooperation and connection with other lines inland was an afterthought and is still a secondary consideration.

Certain taxes and revenues are set aside by law for subsidizing railroad construction and the government policy has at all times been very liberal with a view of encouraging building by private corporations. However, little has been done in recent years.

PERUVIAN CORPORATION

It is not possible to discuss economic conditions in Peru without knowing at least something about the Peruvian Corporation.

In 1890, Peru was in financial difficulties, which were settled by the organization of the London Corporation of the Foreign Bondholders of Peru, who took over the entire foreign indebtedness of the Republic in exchange for certain concessions, including the control of the State Railroads for a period of 66 years.

The Peruvian Corporation was subsequently organized to administer these concessions.

Besides the railroads, the most important concession given to the Peruvian Corporation was that of exploiting three million tons of guano in certain definite regions. The Corporation has later gone into various lines of business, including cotton growing and sugar manufacturing and incidentally even in commercial enterprises.

INCAS AND PRE-INCAS

No country of the Western Hemisphere has as tragic a history as Peru, and what is known of pre-historic times appears even more dramatic.

The story of the aborigenes of North America is interesting mainly from an ethnic point of view. The study of old Mexican civilization is very captivating; Peruvian pre-history arouses equal interest, but, in

addition, it has much that borders on the mysterious and even the mystic.

The high Peruvian plateau, which was the principal seat of ancient Peruvian civilization, would seem to be particularly unfit to be the seat of a great civilization. Yet, civilization has not attained such heights anywhere else in the Western Hemisphere and the genius of the two or more races of humans who have succeeded themselves there, has brought about results, the remains of which arouse the admiration of men of today.

It is not merely in a material way that the races which inhabited the Peruvian highlands were great. They have left no traces of their writings, but various phases of their civilization indicate that their intelligence must have been keen and their understanding of what is now characterized as the "occult" and their mental powers must have been great.

Popularly speaking, the entire period of the history of Peru which precedes Spanish Invasion, is called Inca. However, the civilization of which we find so many and so interesting remains antedates the Incas—who began to rule in 1250—by many centuries.

The Incas are not a race of people, but a dynasty founded by Manco-Capac and queen Mamma-Ocello. They were believed to be children of the sun and to have come from heaven by way of an island in Lake Titicaca.

They and their successors manifested a remarkable talent of organization and they governed the empire

they gradually formed (which included most of what is now Ecuador, all of Peru and Bolivia, and parts of Chile), as an absolute, despotic theocratic, monarchy, combined with an intelligent benevolent paternalism, which seemed at times cruel, but which was free from the orgies of human sacrifices which were so frequent in Mexico.

ETHNIC

Also from an ethnic point of view, Peru is very interesting, even to the casual observer. Its people vary so widely in racial origin and in characteristics, that one can speak of a typical Peruvian even less than of a typical North American.

A Peruvian may be a pure-blooded Indian; he may be a blue-blooded Spaniard, or the son of a recent immigrant, or a mixture of these.

As concerns social status, a Peruvian may be an untamed Indian of the Amazon, or a subdued aborigine compelled to work for a near-slave driver in the vast forests of the "Montana." He may be a mediaeval man, keeping a few sheep and growing a patch of broad beans, living as his ancestors did a thousand years ago, or he may be a civilized Indian—often equivalent to a degenerate Indian—in which case he will be either a laborer with quite modern bolshevik tendencies, or a servant or worker for a white or a near-white master, serving him with doglike faith. Or, if he is a man of

education, he may belong to any of the shades of social standing known in Peru and elsewhere.

MANY ORIENTAL TRAITS

Peruvian civilization is, in the main, Spanish, but many of its phases may be traced to Oriental origins: Patriarchal customs, sense of the unity of the family, veneration of the "pater familias," and reverence of ancestry is almost Chinese. There is an appreciable difference between Peruvian aesthetics and that of European Latins: they love the colorful as much as the Spaniards and the Portuguese, but even more gorgeously so; they are partial to intricacy of line design as much as Italians, but in a more sober way. The draping of the "manta" of the Peruvian women (the chumu of the Arab women), resembles closely, in its tasteful arrangement, the wearing of the shawl by the Hindu wench. The patio is Mauresque, not Spanish, and the seclusion of the home and the delicate privacy afforded to womanhood is decidedly near-Orient.

Quite as much as other Latin-Americans, Peruvians are theoretical rather than practical; they have a penchant for the amenities of life rather than for the commercial and industrial; they are indirect in their approach of a subject nearly as much as Semites and they are Orientals also in their tendency to say the pleasant thing rather than the truth. They will go the nicer

route rather than the shortest and, in many ways, the practical is likely to give way to the beautiful.

The North American, with his directness and absence of show of feelings, is apt to belittle the polite manners of the French, the Latin-American and the Japanese, and he often criticizes them as insincere. However, unless hardened to northern ways, one finds, after living for a while in Lima, Latin-American amiability contagious, and the sweet amenities of life's relationship become agreeable and even indispensable.

Some one said that the North American is guided by a sense of the practical and the Latin-American by feelings and emotions. Perhaps, both exaggerate and have too little of what the others have in excess, and both would do better with a little of the surplus qualities of the other. And, indeed, has there not been a change, during the last few years, both north and south of the Rio Grande? Unquestionably, Latin-Americans are adopting many of the practical methods of the "yanqui."

Moreover, happily, Yankee brusqueness is more and more becoming a thing of the past and saying the pleasant thing—sometimes irrespective of the exact truth—and the "voice with a smile" begin to win, also, in the land of the practical man.

A TOTALLY DIFFERENT POINT OF VIEW

On the other hand, the average North American misjudges the Latin-American for another difference

of temperament. Because every man in the United States is a business man or a worker, we are too much inclined to believe that others should, as we do, work perpetually. We characterize it as sinful idleness, when we hear that many people in Peru and elsewhere have little thought of creating something—much less of making mere money—and spend all or most of their time just living—indulging in literature, sciences and arts, without a thought about producing anything that has money value.

It should be remembered that Peruvians are not primarily business people. Peru—at least as concerns its educated class—is unique among Latin-American countries in proudly holding to the old lines of noble Spanish ancestry, which many families—including some having absorbed appreciable quantities of Indian blood—trace directly to early Conquistadores. To these Peruvians, with few exceptions, pride of cast and duty to their social class is more vital than creative work of their own and the community's material development.

There has been, during the last ten years or so, a great gradual change towards the North American point of view of development, but there are still many Peruvians of keen intellect and high culture who consider modern material development as merely a form of barbarism, which can bring no lasting happiness to the people of their country.

The number of young Peruvians who go to the States

for their education is yearly increasing, but they are almost exclusively commercial and technical students and members of the new, growing middle class. Among cultured people of Peru and other countries, the tendency remains to look to Europe for inspiration and higher knowledge.

To Peruvians, Paris is almost as much the "Ville Lumiere" as to the French.

In spite of a decided desire to absorb from American ways what suits them and what they need most, Europe will continue to mean more to them than the United States, not because we have less to offer them, but because the intellectual life of the North appears to Latins as dry, heartless and material, and because it fails to feed their hearts and to sustain their emotions.

Someone said somewhere: "The Tropics are for dreaming, and other places for work." This largely explains—if not excuses—much of what has been criticized in Latin American indolence, and many Americans who have lived in Peru understand. In spite of all that a man from the north feels inclined to criticize, they find Peruvians, as a whole, intensely affectionate, with a keen love of home life. They are a very likable people who do not mind going out of their way to do a favor even for a stranger. They make good and pleasant friends, and while their ideals are not practical and at times appear incoherent, they are as high as ours.

INDIANS

The ethic problem of Peru and of Bolivia is the Indian. In Peru, it is that of the Quechua, a tame, docile, people crushed by centuries of brutalization. In Bolivia, in addition to the Quechua, there is the Aymara, whom oppression has made rebellious instead of tame.

If considered in his personal qualities, the Quechuan is the most wonderful Indian on earth. He is good natured, humble and always ready to help. He is adaptable and able to do, in his own way, almost anything that can reasonably be asked of him. He is faithful to his "padron" even to the death.

Much has been said about the treatment to which the Indians have been subjected by the Spaniards, which is at least in part the cause of their present temperament. No one approves the cruelties of the past. However, one should in all justice state that the cruel manners which are justly disapproved were not peculiarly Spanish, but were the ways of the times. Moreover, the Spanish kings did not have only Spanish Governors. One of these rulers, Charles V, who was also Emperor of Germany, sent many of his German countrymen to his Spanish possessions. Among these were three of the most cruel men who ever lived on American soil.

Ill-treated the Indian is to this day. However, oppression has been so ingrained into his soul that he

cannot understand life otherwise. If he were free to give up working for his "padron," he would drift from forced industry to voluntary idleness. Kind masters have often been rewarded by their Indians drifting into outcasts even more degenerate than they were as semi-slaves.

A DIFFICULT PROBLEM

The fact is that the Indian will not work regularly for the white man unless forced to do so either by circumstances or compulsion. The white man wants to make money with the natural resources of South America and gives to his activities the name "development." Immigration does not supply labor to West Coast countries as it does to the United States, hence development is not possible without Indian labor, and as the Indian does not work without some sort of compulsion, laws are enacted to put him and keep him in a state of semi-slavery.

The writer has witnessed "recruiting" agents of a large mining company invading a village of the "altiplano," making every able bodied man drunk with free rum, then loaning the best men a small coin to buy more booze with, which indebted them to their employer and legally compelled them to work for him for as long as the debt was not paid.

That day, some 30 men were torn from their families and shipped like cattle, they did not know where.

Arrived at the mining camp, the men are forced to buy on credit from the commissary of the company, shoes, hats, and many things they do not need, and they are kept in debt for as long as their work is needed.

It may be said that the minerals mined by labor procured in that manner were needed to win the War. However, even if this end justified the means, the white man's methods—which in part prevail to this day—are not conducive to raising the moral and intellectual level of the Indian.

It has taken hundreds of years of oppression to bring the Quechuas to their present condition of subjection; it will take generations to bring them, as a race, to the white man's ideal standard of morals, and a continuation of oppressive methods is not leading to that end.

Freedom, betterment of economic condition, parallel with education seem the only remedies. That the Indian is amenable to the highest intellectual level is indicated by the fact that his race has given to Peru and Bolivia several Presidents and a number of their most prominent men.

The Aymaraes of parts of Peru and Bolivia are a race very different from the Quechuas. They were conquered in a military way after centuries of struggle first by the Quechua under the Incas and then by the Spaniards; they were subdued, but never subjugated. They are a mountainous folk not inclined to civilization; they lack inclination and ability to work.

TRAINING VS. EDUCATION

At the beginning of this century, the Government of Bolivia, realizing that the Aymaraes are not amenable to the white man's education, resolved to give them training, instead of schooling. Compulsory military service was enforced also as the Aymaraes were concerned, and the Germans being considered the most successful drill masters a hundred or so commissioned and non-commissioned officers of the Kaiser's army were engaged. The results have been quite remarkable.

While we may feel inclined to consider our educational methods a universal panacea for all kinds of racial and social ills, experience has shown in both Peru and Bolivia that the race problems of these countries needs more than aggressive methods for its solution. It needs above all, time and then a good deal of human love, forbearance and intelligent consideration.

EDUCATION

English and American writers, who have discussed education in Peru, have often built their conclusions upon estimates or statistics of illiteracy and otherwise looked at bare facts rather than at conditions. Their conclusions were necessarily faulty.

It is easy to argue onesidedly upon concrete facts, to theorize on the backwardness of education and the

low intellectual level of the people of some Latin American countries and then perorize upon their need of Anglo-Saxon help.

When discussing the intellectual level of the people of Peru, one must above all remember that Peruvians do not enjoy the ease and the cheapness of travel with which Americans and Europeans are blessed. All but few Peruvians are compelled by circumstances to spend their entire lives within a small area, thus missing opportunities to gain new points of comparison, and to broaden their vision.

Then, critics should also remember that the education of the people of a country is something more than the building of school houses and the providing of teachers. The educational problem of Peru is that as much as two-thirds of its population understand only Indian dialects and languages. The Peruvian Indian is intelligent and he has a keen mentality, but even the one who understands Spanish is not easily amenable to the white man's kind of education. Indeed—as the experience in Bolivia has shown—the Quechua and the Aymara Indians are easily drilled, trained, but taught by the white man's method only with considerable difficulty.

When one, moreover, realizes that there are appreciable proportion of Indian blood—and hence also of mentality—in all but somewhat less than 10% of the population of Peru, one will grasp the difficulties with which Peruvian educators have to contend with and

one will find in Peru much more to be praised than to be criticized.

In spite of difficulties, compulsory school attendance is not badly enforced. There is a school in every Peruvian hamlet. Besides, there are in the country 27 colleges, one private University—that of San Marcos, in Lima—and three National Universities—in Arequipa, Cuzco and Trujillo—beside various professional and technical schools.

The salvation—the progress and development of Peru and other Latin American countries is not to be expected merely by providing more and better educational facilities, nor by more aggressive methods. What Peru needs, above all, is time. The Anglo-Saxon strives to realize all his ideals within the short span of a human life, forgetting that the World and the nations of the earth are not as short-lived as he is. Peruvians refuse to be driven at the pace set by Americans; they take their time even in their efforts to bring about progress; they know that their country will survive this and many other generations and by going more slowly, they will probably avoid many of the mistakes which we of the North are often making.

GRACE

CHAPTER IX

GRACE LINE

TOPOGRAPHY

The eel-shape of Chile is quite as remarkable as Italy's boot, and indeed, it presents to the beholder of a map, a territory of the most extraordinary configuration. It is 2,628 miles long, less than 200 miles at its widest and a strip of land of the same length would reach from Key West to the North of Labrador. It has an area of 757,366 square kilometres, which is equivalent to 292,419 square miles, and a population of 4,038,050 (in 1919).

The territory of Chile may more or less arbitrarily be divided into four zones:

1. The arid zone between the Peruvian border and Coquimbo, where it practically never rains. Even with the aid of considerable irrigation, the agriculture of this territory is, as a whole, much less important than that of similar regions of Peru. On the other hand, this is the nitrates country, which helps producing larger crops in parts of the world where rain is abundant. The Chilean Andes, in that region, form

the western border of the high table land of Bolivia and include many peaks rising toward the sky between 19,000 and 22,000 feet.

But this zone is not entirely arid. It includes the Pampa de Tamarugal, also called the Longitudinal Valley, at from 3,000 to 4,500 feet altitude and varying in width from 20 to 30 miles. Towards its southern end, the valleys and ravines, bordered by high peaks, are claimed by Chileans to be superior in natural beauty to the best Switzerland offers to tourists.

2. The second, or central zone, begins at Coquimbo and ends at Concepcion. Above all, it is a very rich mineral country, and it includes the Central Valley, watered by many streams and rivulets, which is one of the most fertile region of Chile.

3. The third zone, is the South Central region, which includes the district of the lakes, and to which the island of Chiloe may be added. It is the country of diversified farming, but it includes a very important wheat belt. It possesses a great future agriculturally.

4. The fourth zone is that of the Patagonian Islands and channels, which, in contrast with the rest of the coast, abound in countless islands, bays and channels, and form the most ragged shores shown on the map of the earth. It would seem that there the southern end of the Andean range had dropped down several thousand feet, with only some high plateau and peaks above water, submerging the valleys and lower lands which now forms straits and bays.

Vast sections of this zone are very fertile, and even in the Magellanic region, there is already a very large and yet still growing cattle and sheep industry.

Both the third and fourth zones have enormous forest resources, which include soft wood similar to North American pine and spruce, as well as large tracts of timberlands very suitable for the making of wood pulp. Indeed, the forests of Southern Chile have been called a duplication of those of Sweden and Norway

CLIMATE

From the variety of its topography—from the heart of the Tropics to the border of Antarctic regions; from sea level to the highest peaks of the Western Hemisphere—it would seem that Chile should possess a great variety of climates, and indeed it does. There are vast differences between the tropical sun of the northern provinces and the bleak cold of near Antarctic Tierra del Fuego; from the moist heat of northern posts to the dry cold of Alpine altitudes, from the perpetual spring of the Central Valley to the invigorating breezes of the islands.

Nevertheless, these differences of climate are not as great as the erratic—one might almost say vagaric—configuration of the country would lead us to expect.

The most important factor in Chilean climatic conditions is the cold Humboldt Current (see above, page 96), which maintains all the year round along the coast

fringe from Arica to Talcahuano, a comparatively low, constant temperature. But the coast region escapes brusque changes of temperature for another reason. The high Andes are so near the coast that the variable east winds on their course eastward drop to sea level at a considerable distance from the coast. Indeed, given similar altitudes, that coast has probably the most constant temperature in the world and weather conditions during certain periods of the year are so well known as to be depended upon almost to a day.

REMARKABLE UNIFORMITY OF TEMPERATURE

A remarkable characteristic of the climate of Chile is the uniformity of temperature in almost all its parts. Nowhere are extremes of heat or cold to be found. For instance, the minimum and maximum temperatures in both Arica in the far north, and Ancud in the south, differ only by 5 or 6 degrees centigrade. Even in the extreme south, the mean maxima and minima differ only by 9 degrees.

The highest temperature observed in Arica is 94° F., at Valparaiso 87°, at Punta Arenas 74°. The minimum temperature observed in Arica is 49°, Valparaiso 38° and Punta Arenas 18°.

On the other hand, the rainfall of Chile is very uneven. In the north zone, the scant atmospheric humidity is barely sufficient to condense in the form

of occasional fogs and heavy dews, called locally *camanchacas*. In the coast belt of the Central Zone, rains are more frequent and more copious than in the Central Valley at the same latitude. For instance, mean precipitation in Valparaiso is 23° and in Santiago only 14°. In many parts of the south, the rainfall exceeds 100 inches, the maximum observed being at Cape Raper, at 27° latitude, 236 inches annually.

Snow never falls in the northern and central zones, except in the high mountains, but south of the 47th degree, snows are frequent and in Punta Arenas snow covers the ground for weeks at a time during the winter months.

No part of Chile is subject to destructive hail storms, such as are frequent on the Argentine plains.

RAILROADS

Chile is the first Latin American country placed on the railroad map. In 1849, William Wheelright, an American, the founder of the Pacific Steam Navigation Company, completed the construction of a line from La Caldera to Copiapo.

The following year, Wheelright, associated with Allen Campbell, surveyed the line between Valparaiso and Santiago. This line was built, later, first by S. W. Greene, of Rhode Island, and completed in 1893 by the famous Henry Meiggs, the builder of the Cen-

tral Railways of Peru. The total cost of the Valparaiso-Santiago railroad exceeded 12 million dollars.

During the decades which followed, Chile has developed a large mileage of railroads, which is exceeded in South America only by Brazil and Argentina. Three of the Chilean railroads include the Pacific terminals of International lines, namely the Arica-LaPaz, the Antofagasta-La Paz, and the Transandean Railroad, from Valparaiso and Santiago to Buenos Ayres.

The Antofagasta - La Paz Railroad also connects at Uyuni with the new La Paz-Buenos Aires Railroad.

Among the small privately-owned railways of Chile is a small line from Punta Arenas to the Loreta coal mines, of 2 feet 6 gauge, the southernmost railroad in the world.

At the end of 1918 the State Railways operated 4,567 kilometres and private companies 3,945 kilometres of lines. At the end of 1919, the railroads of Chile employed 36,000 people, 27,000 of whom were on the payroll of Government owned and operated lines.

The gauges of the Chilean railroads vary from 2 feet 6 inches to 5 feet 6 inches; the latter on the State lines.

As in other countries, there was a period in the railroad history of Chile, when the problem under discussion was whether or not to adopt a policy of railroad building. In all or most other countries, the differences

of opinions were whether railroads or highways would be the most useful, but in Chile opinions differed as to whether money should be expended for port works or for railroad lines. Those in favor of port works argued with some justice that with a coast line such as that of Chile, the railway haul would necessarily remain a limited factor, and, indeed, even now, it exceeds 75 miles in only a few instances from any port, and water transportation will presumably always remain the cheaper mode of communication.

The decision was cast in favor of railroads, but mainly for strategic reasons. Most of the transversal lines pay moderately well, while the already built sections of the Longitudinal Railway have proven a costly and unproductive undertaking, both as concerns construction and operation.

All of the administrations which have succeeded themselves have been committed to the completion of the Longitudinal from Arica to Puerto Montt, but in spite of projects on paper, construction work done in late years, was almost exclusively on transversal lines.

RAILROAD PROJECTS

The principal railroad project whose execution has been decided upon is a direct line from Valparaiso to Santiago, via Casa Blanca, which would be only slightly more than half the length of the present line.

The cost of this line is estimated at 12 million dollars. As it will open a thus far neglected fertile region, it is expected that it will pay well.

The second most important project is the electrification of the present Valparaiso-Santiago line and of the State railways, at a total cost estimated at 32 million dollars.

There have been put forward, in recent years, not less than a dozen distinct transandean railroad projects, all but two south of the present line. One of these would be an extension of the Chilean East-Central Railways, with present terminal at the port of Lube. Concepcion and Talcahuano, further north, would be made the terminal of the new system, which would run southeastward, and use the State Line from Los Sauces to Curacautin for 110 kilometres. An extension would be built at a cost of some 15 million dollars through the Longuimay pass to join the Neuquen extension of the Buenos Ayres and Great Southern Railways.

Another line, much further south, which seems to be favored in Argentina would be a line from Huidiff, in the Valdivia Puerto Montt railroad. From there, the San Martin Railway operates a road transportation service to Rinahue, on Lake Rinahue (7 miles). From there a steamer runs to Chosuelo (20 miles), where rail traffic again begins to Lake Lacar (Argentina) and steamer is again taken for San Martin (50 miles).

The company originally intended and still hopes to build a through line from Ocean to Ocean.

Another project which has been much discussed is the continuation of the Caldera-Copiapo line across the Andes to Tinogasta, Argentina. This line had already been projected by Wm. Wheelright 70 years ago but the idea found little echo on the Argentine side of the Cordillera.

Numerous local lines are projected and some of them are actually being constructed, but none is of general interest.

THE TRANSANDEAN RAILWAY

The "transandino" is and for several years will remain the only railroad crossing the Andes.

The Transandean Railway is not one, but a combination of several lines running direct trains from Valparaiso and Santiago on the one end, to Buenos Ayres on the other.

The following Railroad Companies form part of the Transandean: The Chilean Government Railroads, as far as Los Andes; The Chilean Transandean Railway, from Los Andes to the Argentine border; the Argentine Transandean Railway, from the Chilean-Argentine border to Mendoza; the Argentine Great Western Railway, from Mendoza to Mercedes; and the Buenos Ayres and Pacific Railway, from Mercedes to Buenos Ayres.

All these Companies, except the Chilean State Railways, are British, domiciliated in London. The General Manager of the system has been for several years and is Mr. J. H. Hale White, in Santiago.

The total length of the system is 1443 kilometres, a thousand miles.

The "Transandino" follows the old "Transandean route," which was the main highway between Chile and Argentina already in the days of the Incas. Later, it became the principal artery of traffic between the Spanish Settlements on the Rio de la Plata and Peru. When the Spaniards began to bring negroes to Peru, it became the "slave route" and thousands of blacks have made the journey on foot over the Argentine pampas and over the "Cumbre" of the pass.

After Argentina and Chile became independent from Spanish rule, both countries constructed highways.. as far as feasible, along the route, and until the opening of the railroad, the journey was made fairly comfortably partly in stage coaches, partly on mule back. The journey from Mendoza to Los Andes consumed four days.

The scenery in the Straits of Magellan is more than interesting—it is awe-inspiring. But the tourist will not lose in anyway by taking the Transandean Route.

The panorama, from one end to the other of the line between Mendoza and Los Andes is unique in the world for the variety and the grandeur of the scenery.

Leaving behind exquisite pastoral scenes, the train

climbs up mountain sides, along rocky gorges, at times above vertiginous precipices, past an ever changing scenery—audacious rocks, snowcapped peaks (among them the Aconcagua, the highest mountain in the Western Hemisphere) turbulent torrents, mighty cataracts and lovely waterfalls, peaceful lakes high up in the region of the Condor, near the line of eternal snow.

Only those who have made the journey can appreciate the magnitude of the undertaking of building the Transandean Railway. The towering Andes, even the altitude of the Cumbre (the high pass) for years appeared as an insuperable barrier destined to separate for ever the countries of the Pacific and of the Atlantic coast. But two bold and clever men, Juan and Mateo Clark, both born in the Argentine of English stock, not merely conceived, but set themselves about to execute the audacious project of uniting the two Oceans by rail.

The engineering and financial difficulties which had to be overcome were such as to cause both railroad men and capitalists to declare the project irrealisable. However, as usual, courage and perseverance, coupled with clear vision and good judgment, won in the end.

The combined length of the Chilean and Argentine Transandine lines (from Los Andes to Mendoza) is 250 kilometres. The altitude of the main tunnel at the frontier is 3205 metres. The tunnel is 3167 metres long, 1360 metres of which on Chilean territory.

On the summit of the pass (the Cumbre), 785 metres

above the level of the tunnel, at the international border, there is a monument dedicated to "Christ the Redeemer," which is of much greater than religious and local significance.

Less than a generation ago, after a long war between Chile and Argentina, and the signing of a peace treaty which did not settle things right, both countries were preparing for another war. Then arose just a woman, a mother, who formed a committee of Argentine women who went to visit a small group of women in Chile. They decided that even if men craved for the glory of battle, the women of both countries should not give any more their fathers, sons, husbands, brothers to the Moloch of War. The movement spread fast. The difficulties between the two countries were overcome, and peace in fact—instead of a mere peace in name—was commemorated by the "Christ the Redeemer" monument.

This "Christ of the Andes" has been placed there not only in a spirit of gratitude, but as a memento. Its true meaning is "Thou shalt not pass," for any but peaceful purposes.

The Transandean sections of the "Transandino" are of meter gauge, while both the Chilean State and the Argentine connecting lines are of the wide 5' 6" gauge. This necessitates change of cars in Los Andes and Mendoza. As, in every probability, a direct railroad line will ere long be constructed between Valparaiso and Santiago, via Casa Blanca, the present line

will be released to local traffic, for which a wide guage is unsuitable. If a proposal of Mr. White is accepted, the guage of the present Valparaiso-Santiago line will be reduced to one meter, which will permit the running of through trains, without change, from the Pacific to the Atlantic.

MERCHANT MARINE

Chile has always had an ambitious merchant marine program. In 1918, there were 130 steamers registered in Chile with a total tonnage of 69,968.

During the last two years, the Compania Sud-Americana de Vapores, the most important Chilean Company, has acquired several vessels, and established direct services both to New York and Europe. Several coastwise shipping concerns have also increased their fleet so that the tonnage of Chile has probably been nearly doubled.

ECONOMIC CONDITIONS

Of the West Coast countries Chile is no doubt, the first in industrial and commercial deveolpment, if not in natural resources. In the intensity of its economic life it certainly equals, while in the total of its developed wealth it is, among Latin American countries, second only to the much larger Brazil and Argentina.

With the exception of leather and textiles, the manufacturing establishments of Chile are all small and even very small, and, owing to labor and other conditions, the opening of large factories is not to be expected.

The mining industry will be discussed in another chapter.

Agriculturally, Chile is not as important as Argentina, Brazil, Peru and even Uruguay. The agricultural industry which is likely to gain most in importance is cattle. Agricultural exports, at present include packing house by-products, wool, beans, peas, lentils, bee products, chinchilla and other skins, medicinal plants and tanning agents.

The *money* of Chile is based on the gold peso weighing 0.5991 gram, of 0.91633 fineness, which is the equivalent of 18 pence sterling gold, or to \$0.365 U. S. gold. This gold peso is the unit for exchange and all financial transactions. There are 5, 10 and 20 peso gold coins, but they are practically never seen in circulation.

Legal tender is paper currency whose value fluctuates much in spite of endeavors of the government to stabilize it as close as possible to the value of 10 pence. The law provides that the Government should set aside yearly a certain sum to increase the fund for the redemption of paper currency, but war and post-war conditions have prevented an appreciable increase of that fund.

CHAPTER X

CHARACTER TRAITS

The present population of Chile is conservatively estimated at four millions, a very much larger proportion of which than on other West Coast Countries is of pure European stock—mainly Spanish.

On landing in Valparaiso, the stranger coming from the North at once notices an alertness of manners and of gait alien to Peru. It is not quite the hustle of Chicago, but if Buenos Ayres is likened to the Windy City for the phenomenal growth of its Meat Industry, Valparaiso may with some justice be called the Chicago of South America for its hustle, and greater apparent activity than other Latin American cities.

It has been said that the Peruvian is inclined to mannerism and that the Chilean is more direct at first approach, and indeed, many Chileans are at time found rather abrupt. The fact is that they appreciate genuine good breeding quite as much as other people, but, on the other hand, more than other Latins they dislike, and even resent, the parvenu airs of

many of the newly rich of Argentina and the air of superiority of the would-be rich North American.

CAUSES OF CHARACTER DIFFERENCES

The causes of the principal peculiarities of character of the Chileans are geographical, racial, historical and economic.

On the one side, the Chileans have one of the highest mountain ranges and on the other the largest Ocean. In the North there is an almost impassable desert, and in the south the Antarctic wastes. No people of any nation is as completely hemmed in by natural barriers, and no wonder they have gradually developed self-reliance and a tendency to be always on the alert, on the defensive, and always ready to take the offensive should the occasion require it.

Another geographical factor is that a larger proportion of the Chileans live within sight of the sea, and have seen the sea, with its wide horizon, and have gained thereby a bigger, broader mental vision of the world than the people of some other countries.

In what is now Peru, the Spaniards found a docile industrious race, which they conquered almost without a fight and enslaved with little difficulties. But, further south, they met warlike Indians, and they had to conquer with the sword almost every foot of the ground they occupied.

Moreover, the Araucanian was a clever hunter and fisher, but not a worker. He was untrained, unaccustomed and incapable of any kind of intensive, regular work. This forced the early settlers of Chile to do much hard work themselves, just as the settlers of North America.

An important factor in the racial make-up, and hence in the character of the Chilean, is a considerable colonial European immigration other than Spanish. Two or three centuries ago, many English, Irish and Germans settled in Chile. Their blood is now fully amalgamated in the "melting pot" with effects similar to the United States.

Spanish names of unquestionable English etymology are rather common. Among the governing classes are found many such names as O'Higgins, Cochrane, McKenna, Edwards, Pratt. They are descendants of Colonial immigrants and as little British as our Roosevelts are Dutch and our Bonapartes are French.

Chile has never had more than a fraction of the large immigration which has populated other South American countries of the temperate zone (Southern Brazil, Uruguay, Paraguay and Argentina). On the other hand, what Chile has lost in quantity, it has gained in quality. Those who came were not attracted by the prospect of easily made fortunes, nor frightened by the thought of hard work. Taken as a whole, they were of a better type than the immigration en masse which went elsewhere and they have con-

tributed to the giving a different, stronger stamp to the Chilean character.

Not having had a large immigration from among the lowest races of Southern Europe and practically no Jewish immigrants from Poland and Russia, the "melting pot" has functioned more thoroughly than elsewhere. The people of Chile forms a homogenous, united nation and they have been free of the many conflicts of race, religion and language with which the United States was confronted.

It is well to add that a Chilean writer, Nicolas Palacios, bases his claim of the superiority of the Chilean stock upon the preeminence of Northern Spanish blood among the early colonists.

Among the economic factors which have influenced the formation of Chilean character traits may be mentioned that Chile does not possess unlimited fertile agricultural lands like other countries. Therefore, agricultural development was undertaken from the start in an intensive, rather than in an extensive manner.

Then, Chile possesses as much natural wealth as her neighbors, but it is so distributed and so located that it requires more efforts, and there are greater difficulties to overcome to render that wealth available, than for instance in Peru and Bolivia. This has naturally had some influence in the formation of Chilean character traits.

SE CONNAITRE, C'EST S'AIMER

Many U. S. Americans who go to Chile after having spent some time in Peru or in other Latin American countries, construe the greater reserve, and the lack of expression of personal feelings toward them, as antagonism.

It is the writers opinion that no Latin people more sincerely desire cordial relations with the people of the United States. The Brazilian is proud to compare his country, the Colossus of the South, with the Colossus of the North. In a similar mental attitude, the Chilean likes to be called the Yankee of the South.

It is regretable that the Chileans see, rightly or wrongly, so many obstacles to the realization of their sympathetic desire toward us.

First there is the Monroe Doctrine.

They recognize the necessity of American unity for mutual protection, but they resent the claim of the United States to be their unsolicited protector.

Above all, they resent the ever changing meaning and the application of that Doctrine according to the ideas of the administrations succeeding themselves in Washington.

They know well and are willing to admit the defects of their political system, but from what they know of ours, they conclude that we are not much better off than they are and that we are rather poorly fitted to become political reformers.

They hear on the one hand the solemn declaration of American statesmen that we do not want to interfere in the affairs of Latin American countries. They compare these words with the scandalous graft exposes of the American administration in San Domingo, and the tragedies of Haiti. They see these very same statesmen taking away every vestige of autonomy, even the municipal administration, in San Domingo and in Haiti. They know that Panama, Nicaragua and Cuba are far from being absolutely free countries.

They do not realize the good intentions, if not the good purpose of these American interventions. All they see, is American direct and indirect meddling, in spite of the often given word that the U. S. does not want to interfere in Latin American internal affairs, and they distrust us.

Other causes of prejudice against North Americans are economic.

Quite wrongly, Latin Americans have blamed us and our supposed thirst for dollars as responsible for exchange conditions unfavorable to them.

Then, they remember that European exporters before the war, gave their importers long term credits while the American exporter usually wants cash and even money in advance.

Moreover American export manufacturers have often been negligent or shown a deplorable ignorance of the needs of South Americans. Then, the American export business has grown faster than men could be

trained to rightly handle it. Also, it has largely been taken up by a foreign born element whose business ethics are not of the highest. The result has been criticism of American ignorance, lax business methods and doubt in American honesty.

The Chileans may be all wrong but that's not the point. The purpose of the above is not to criticize or to judge, but to state reasons for misunderstandings, so they may be overcome.

Then, there is our claim to be the only "Americans." Other Latin American people have forgiven us stealing what is also their thunder. They have passed lightly over this little bit of grabbing something immaterial with a slight, impatient movement of the shoulders signifying "Well, these Yankees are not well balanced anyway."

On the other hand, the Chileans are not quite as satisfied. At a recent semi-official meeting of some high government officials, prominent business men and newspaper representatives, the question was discussed whether or not to invite the other nations and the colonies of the Western Hemisphere to a Congress of a certain industry.

A North American, who was present, made the motion that the proposed gathering should be called "Pan American Congress of——" At once, a storm of opposition arose. After a very brief discussion during which it was frankly stated that the name America was given to South and not to North America, that people

were known as Americans in South America several generations before there were colonists in the Northern Continent, and that all nations of the Western Hemisphere were Americans, the motion was turned down by acclamation and the name "American Congress—" was retained.

The number of North Americans who go to Chile, and of Chileans who visit the United States is continually increasing, but neither side learns as much about the good side of the other as they might, and too many are still ignorant of what the other really is.

Americans who have never left the United States are yet, in spite of all that has been written on South American countries, inclined to think of the countries south of us as the lands of a burning tropical sun, of pestiferous jungle and unsanitary cities, and of lazy, ignorant, blood thirsty people.

Latin Americans pay us back by thinking of the United States as of the land of things ridiculously big—an enormous country, huge cities, great catastrophes, prodigious fortunes and the barbaric splendor of a people which has no other ideals than dollars.

How untrue, and how unjust!—on both sides.

One of the truest sayings is "*se connaitre, c'est s'aimer*" (to know one another is to love one another), and indeed, with the still prevailing mutual ignorance, a better All American feeling can hardly be expected.

How can we overcome the present misunderstandings?

The difficulty is that, just because of the opinion the Chileans have formed of North Americans, they continue to look toward Europe much more than up to us for enlightenment and inspiration.

The number of Chileans who speak three or four languages is considerable. They therefore familiarize themselves quite easily with European art, sciences, industries and the ways of the people. Their vision and their understanding of other nations is therefore, usually greater and broader than that of the North American of the same class. This, obviously, puts the American who goes to Chile at a disadvantage which is not always fully compensated by his greater ability, knowledge and experience in technical matters.

The Chilean pride is thereby aroused and he is not likely to appreciate at their just value the qualities of the "yanqui."

Just because of the prevailing misunderstandings, the U. S. American, until he proves himself different, is placed on the same social level as the Jew and the German. His qualities are admired; his superiority in some ways is recognized, but he is not prima facie considered socially quite good enough to associate with in the intimate family circle.


Hence, the North American has too little opportunities to observe real Chilean life, and he quite wrongly often judges Chile as tourists seeing only the so-called Gay Life of Paris (which is supported almost exclusively by strangers), and concludes that France

is morally rotten, not knowing that the French are great lovers of family life.

The "Yankee" sees the superficial, the outside and compares it with what he knows of good and beautiful in his country and then forms an unfavorable opinion of Chile and the Chileans.

Of course, this mutual prejudice is, speaking frankly stupid and unworthy of the people of two great nations.

We seem to move within a vicious circle which will need time to wear out.



CHAPTER XI

CHILE'S COAST AND PORTS

Owing to its long coast line and the narrowness of its territory, water transportation will presumably be always the cheapest means of communication in the greatest part of Chile. Hence, the transportation problem, unlike that of other countries, is not so much the building of highways and of railroads, but of adequate facilities.

The greatest traffic problem in Chile is that most of its important ports are not more than open roadsteads. There are along the coast several interesting bays and undeveloped natural harbors, some of them deep and almost land locked, but they are where ports are not needed.

The Ocean, a few miles from the coast, along the usual course of vessels plying between the Canal and Valparaiso is always so pacific, so reliable and the voyage so near useful landmarks, that many navigators prefer this run to any other.

On the other hand, the Ocean, nearer the coast, is

almost constantly in fury, rendering landing and the working of cargo in many ports difficult and at times impossible. It seems as if the Ocean surface, bent on continuing its movement eastward, was furious at the obstacle offered by the coast, and endeavored to surmount it by battering it heavily almost unceasingly, and with a force gathered all the way from Australia.

The general aspect of the Chilean coast north of Valparaiso is not very different from that of Peru. It is the same barren, melancholic stretch of rock and sand, alternating with huge mountain masses bathing their very feet into the sea. It means at first, an interesting study of a great variety of shades of brown, which, however, soon becomes monotonous. And it is only the realization of the great economic importance of the region which retains the attention.

From Talara to Arica, the coast runs in a general southerly direction, but at Arica, the coast takes a sudden turn and begins to run almost due south, almost as far as the entrance to the Straits of Magellan.

Arica is 881 miles north of Valparaiso, and 35 miles southeast of the present boundary between Peru and Chile. Its roadstead is fairly well protected by the *Morro de Arica* (Arica Head), of tragic history, and by *Alacran Island* where, until a few years ago, interesting Spanish ruins were to be seen, which since have been razed because of modern 'military necessity'. Arica's *light* is exhibited from Alacran, from a skeleton tower with green coupulo. It shows a short flash every

3 seconds visible 14 miles. Off the coast, toward the north, the hull of a wrecked Chilean cruiser is visible.

Arica Bay is the only point of the long stretch of coast we have followed thus far which might almost be called picturesque. At any rate, we again see some green above the roofs of the town, and there is the beginning of the fertile Valley of Tacna, raising gradually from the sea, to our left.

Moreover, on a clear day, we may enjoy the unusual and incomparable view of the summit of three snow-capped mighty volcanoes, namely the Gran Misti of Arequipa 18,500 feet high; the Urbinas 17,600 feet high and the Tucupaca, 17,300 feet high.

All but the summit of these peaks is hidden behind the costal range of mountains bordering the high plateau land, which, from our point of vantage, usually appears like a huge cloud bank.

Toward the northeast, beginning a short distance from the shore, we may notice a considerable expanse of green, which is the lower end of the Tacna Valley; 38 miles inland is the town of *Tacna*, at 1840 feet altitude at the junction of two other valleys that of Azapa, and that of Chacayuta.

Tacna has 28,000 inhabitants and it is the chief town of the province of the same name, which is held by Chile, but claimed by Peru. The entire population of the province is only 45,000, and it does not produce

sufficient food for the maintenance of its scant population and of the military garrison.

However, the province is minerally rich and desposits of a variety of valuable minerals has been determined. Nevertheless, Tacna seems to be claimed by Peru on sentimental rather than economic grounds. While its retention by Chile is explained as a military necessity. An almost impassable 100 miles long desert separates the present territory of Peru from the Province of Tacna and Chileans claim that they need Tacna to protect themselves against possible attacks from the side of Peru.

Nevertheless, the writer has heard Chilean high Government officials express the wish that some arrangement be arrived at to bring about a better feeling between the two countries. Chileans state that the idea of returning Tacna to Peru cannot even be discussed. On the other hand they say that if Peru would consent to it, Chile might grant the province to Bolivia for a consideration.

The essential condition for such an arrangement would be that both Peru and Bolivia be perfectly satisfied with it. But for as long as the present animosity of these countries toward Chile remains, it is positively stated that Chile will maintain the statu quo.

When rumors of the possibility of such an arrangement reached Mollendo, Peru, as well as Antofagasta,

Chile, both ports, fearing loss of the transit trade to Bolivia, opposed the idea vigorously.

As a matter of fact, Arica is not merely the sea outlet for the province of Tacna, but one of the three sea ports for Bolivia. It is the Pacific terminal of the shortest of the three railroads connecting La Paz with the sea, but the least used. It has frequently been characterized as one of the two worse railroads of the Western Hemisphere, the other being in Haiti.

The railroad was built by Chile, in conformity with the treaty of Ancon, at the termination of the war between Peru and Bolivia on the one side and Chile on the other, in 1879. It is 248 miles long, 129 miles of which on Chilean territory. The highest elevation is at an altitude of 4257 metres or 13,936 feet. It has cost \$15,000 to build. The line is operated by a British Company.

It is only a short night's run from Arica to Iquique, and between these two important ports are three small and yet interesting ports.

Pisagua is the northernmost nitrate port, it is located 67 miles south of Arica and 40 miles north of Iquique by sea and 114 miles by rail, at the foot of lofty hills. The port claims to be second only to Iquique in the shipment of nitrates, but the town is much less important, with only 8000 inhabitants. The railroad climbs up the hill sides in several zig zags, and when on the high plateau the rich lands of Tarapaca, forms a

part of the Longitudinal railroad with spurs running down to the coast to Caleta Buena and Iquique.

Caleta Junin is the port for Junin Alto, (a small town on the top of the cliffs, an inclined cable railway maintaining communications,) and also for the nitrates from La Pampa Oficina.

Caleta Buena, 20 miles north of Iquique, has replaced Mejillones *del Norte* as a nitrate port. There are two towns, each of about 1500 inhabitants, one near the coast, the other, visible from the sea, on the bluff above. A 21 miles long railway runs to Agua Santa Oficina.

A NEAT LITTLE CITY

Iquique 784 miles north of Valparaiso ranks fourth among Chilean ports and fifth in population among Chilean cities. It is the first nitrate port of the country. Besides nitrates, considerable quantities of silver are shipped from the famous Huantajays mines, only ten miles away, which have been operated 350 years and have produced above half a billion worth of the precious metal, more than the famous silver mountain of Potosi, in Bolivia. Hay is also shipped from the Pampa de Tamarugal, in the season.

Iquique road is unprotected in the north and only imperfectly protected in the southwest by Iquique

island and Morro Point. Extensive port works were surveyed before the War, but, except for desultory activities, they have remained in abeyance. Iquique *light* at the entrance of the harbor is exhibited 96 feet above water from an iron structure. It shows a flash every 12 seconds and it is visible 14 miles.

From Iquique, a standard guage railroad, 244 miles long runs to Lagunas, passing through some of the most important nitrate fields, another line, mentioned above, runs to Pisagua, 114 miles.

The city of Iquique has a little larger population than Antofagasta, though, commercially, the latter has become more important. It vies with the latter in an effort to become beautiful in spite of arid climate, dust and other adverse circumstances. It appears to have been more successful than Antofagasta in creating boulevards and public gardens and it has the advantage over the latter of picturesque small beaches and rocks at the end of the Cavancha promenade and gardens, the earth for which had to be brough down from the Pampa at great expense.

The water supply of Iquique comes from the Pica springs 75 miles in the mountains, In addition, two distillation plants are kept in working order so as to be able to use sea water in case of emergency.

The region around Iquique differs from the rest of the coast in that, during the last century, it has occasionally been visited by storms. Peculiar in that

they are usually followed by copious rain. Within a few days afterwards, the otherwise barren hills become covered with luxuriant vegetation, which, however, is only short-lived.

Strangers should see the Cavanha Promenade at the southern end of the horse car line. The Chalet Suisse, with bath houses, near the beach, is probably the best place in Iquique for refreshments and for luncheon.

Tocopilla, 117 miles south of Iquique is a port of the Chile Copper Co. and otherwise unimportant. Ore is shipped from three points on Tocopilla road, namely Tocopilla, Bella Vista, and Duendes, each about $1\frac{1}{2}$ miles from one another.

Cobija, also known as Puerto La Mar, 37 miles south of Tocopilla, is a port for a mining region which produces copper, tin and silver. A 35 mile long railroad line runs up to Toco, a town of some 5000 population.

Mejillones (also known as Mejillones del Sur—in contradistinction with Caleta Buena which is also called Mejillones, but del norte) is 31 miles south of Cobija, 43 miles north of Antofagasta by rail, and 61 miles from the latter by sea. It serves practically the same

district as Antofagasta, but shippers seem to prefer the latter. A branch of the Bolivian Railways runs from Mejillones joining the line from Antofagasta 28 miles inland. Before the War, port works were surveyed.

Leading Bluff, marks the westernmost point of the southshore of Mejillones Bay. It is a remarkable headland, about 1000 feet high, facing north, covered with guano and having the appearance of a chalky cliff. *Leading Bluff light* is exhibited 335 feet above water, flashes every 3 seconds, and is visible 18 miles.

A few miles to the south, we see the *Morro Mejillones*, 2476 feet high, standing conspicuously above the surrounding heights, having the appearance of a truncated cone.

From **Leading Bluff**, we sail with the land for about 30 miles to *Tetas Point*, the southwestern extremity of the Moreno Peninsula, from which a *light* is exhibited 155 feet above water, showing 2 flashes every 6 seconds, visible 18 miles. From the point and adjacent waters, *Mount Moreno* rises almost abruptly from the sea to an altitude of 4161 feet.

From *Tetas point*, the coast takes a sharp turn eastward, forming a well protected bay in the deep of which is the village and little port of *Chimba* which, as *Mejillones*, has endeavored to compete with *Antofagasta* and lost. Its cove is well protected by the islet of *Guaman* and it would make a commodious, very good port. Concessions for port works were recently

granted to a nitrate company and a railway will be built connecting Chimba with the Bolivian Railways, but the concession was granted under the express condition that only nitrates will be shipped from Chimba.

In the region between Chimba and Tetas point evidence of the existence of *prehistoric people* have been found, who must have lived there before the arid period begun.

A BUSY PLACE

Antofagasta disputes Iquique's claim to be the third port of Chile. According to the last census, it has only 65,000 inhabitants to Iquique's 70,000, but patriotic citizens of Antofagasta claim that conditions have been reversed. No statistics are available to show conclusively which of the two cities is ahead of the other.

Antofagasta seems to be more important commercially. It has larger business houses, more, larger and better stores and there is more hustling on its main streets than in Iquique, and an air of prosperity prevails at every turn. On the other hand, Antofagasta has not yet succeeded in adorning itself as well as the sister city and, from a scenic point of view, it has little to show.

The town is built on gradually and very regularly rising ground toward the foot of the surrounding mountains. It seems to take a sudden turn upward at the

edge of the town. There is practically not a single level spot in the whole area two blocks above the port, and yet not a depression in the ground anywhere. Hence no city on the entire coast can be seen as well from the sea and offers as beautiful a spectacle at night.

No city in the world obtains its water supply as far and under as great difficulties as Antofagasta. Water is carried in pipes from the Rio Loa, near the Bolivian border 173 miles away. The city now boasts of a thousand miles of water pipes.

An interesting ride is to the new Boulevard and Praya Blanca, where there are facilities for sea bathing. A very good automobile road has been made to Caleta Celosa. Strangers are welcome at the automobile club, an oasis of green in an ocean of brown, midway between Antofagasta and Caleta.

The principal Hotel in Antofagasta is the Grand, on the main public square, on which the Post Office and the Telegraph are also located.

TERMINAL OF BOLIVIAN RAILWAYS

The Bolivian Railways, of 2 feet 6 guage, have their terminal in Antofagasta are the most popular route to La Paz. The line reaches its highest elevation near Ollague, at 3960 metres, or 12,989 feet.

Antofagasta roadstead is one of the poorest anchorages of the West Coast. It is nearly as bad as those of Mollendo and Salaverry, and, before port works to

cost some 30,000,000 pesos were projected and surveyed it has been a question to move the port to Chimba, just mentioned. The projected port works, as many others, were kept in obeyance, but since the Armistice sectional bids have been let for part of the work, which is progressing slowly.

Much nitrate is shipped from Antofagasta, mainly from the region around Calama. It is also the main shipping point for the Chuquicamata copper mines, on the mountain sides beyond Calama. These mines are the largest copper mines in the world as concerns the quantity of ore treated and the number of men employed. The ore is very poor—containing only 2-3% copper—but self leaching so that metallic copper can be produced there cheaper than elsewhere. During the war, some 20,000 people were employed there, including some 800 Americans.

Until the end of the three cornered war between Chile, Peru and Bolivia, 1878-79, Antofagasta was part of Bolivia. That country still claims it, but not as strongly as Peru claims Tacna. As a matter of fact, there are only very few Bolivians in Antofagasta, and, even if held at the date originally fixed, there is no doubt that a plebiscite would have been in favor of Chile.

Antofagasta is flanked by two landmarks of very similar shapes, Mt. Moreno, 4161 feet high, mentioned on previous pages, and Cerro Grande (Mount Jaron)

3800 feet high, both huge cones, rising almost abruptly from the sea.

At the foot, north of Mount Jaron lies the little port of *Caleta Celosa*, only five miles from Antofagasta, and while passing we can easily distinguish the sheds of the Aguas Blancas railway which runs to nitrate properties in the interior.

Taltal, the next interesting port, is 110 miles south of Antofagasta, and 445 miles north of Valparaiso. It is the terminal of a British owned system of railroads totaling 184 miles running first to Cachinal, then to the famous El Guanaco gold district. In the region are said to be considerable areas of undeveloped nitrate lands, as well as copper, gold, silver and other ores.

Taltal is the southernmost of the nitrate ports. The town has some 20,000 inhabitants, is well laid out, but appears more dusty than other Chilean coast towns of the arid region.

Charanal, 46 miles north of Caldera, on the border of the desert of Atacama is the shipping point for three copper smelters. The Andes Mining Co., (American) contemplates considerable harbor works and with the development of cobalt, gold, silver and borax deposits in the interior, the port will gain in importance. The railroad line runs from Charanal to Hundide and joins the Copiapo-Caldera section of the Longitudinal Railways.

OLDEST L.-A. RAILROAD

Caldera, 337 miles north of Valparaiso, on Ingles bay, one of the best sheltered ports of northern Chile, is the port for Copiapo and it exports gold, silver, manganese and copper. The copper mines in the interior are now worked at a depth of 3500 feet, and it is said to be the deepest mining in the Americas. Copiapo, 50 miles away is a curious mixture of the old, one might almost say the antique and the new. On one end old buildings from Spanish times, old conservative customs, and on the other the hustle and bustle incidental to mining booms and even a modern school of mines.

Copiapo is the center, and Caldera the sea terminal of an important system of railways. It is interesting to note that the railroad from Caldera to Copiapo is the oldest of all *Latin* American countries. The oldest line in *South* America was opened a year earlier, in 1848, in Demerara, British Guiana.

The Caldera-Copiapo line was built with Chilean Capital by an American, William Wright, who later, associated with Allan Campbell—another American—surveyed the Valparaiso-Santiago Railroad which, later again, was built by two other Americans, first S. W. Greene of Rhode Island, and completed by the famous Henry Meiggs.

An extension of the Caldera-Copiapo Railroad across the Andes to Tinogasta, Argentina, has been projected from the start, and discussed for many years.

Caldera is the winter station for the Chilean Navy. Caldera *light*, one flash every 20 seconds, is visible 14 miles.

Carizal Bajo, 73 miles south of Caldera, 92 miles north of Huasco, is the outlet for three smelting plants, serving in part the same region in the interior as that served by Huasco. A 23 miles long railroad line runs to Carizal Atlo, with a 63 miles branch to the Cerro Blanco copper mines, a 53 miles branch to Jarillas copper deposits, now exhausted, and another to the Yerba Buana manganese works.

Huasco, about 60 miles south of Caldera and 40 miles north of Coquimbo, is on a well protected small bay. The scenery about the town and the port has a picturesque, green appearance to which one is not accustomed when sailing along this coast. Minerals, live stock, grapes and raisins, as well as hay, are the principal articles of export. Huasco is the port for Vallenar, the capital of the province and the region is the northern limit of successful agriculture without irrigation. Huasco grapes and raisins are claimed to be the sweetest in the world. The railway runs north to Vallenar, where it joins the Longitudinal System of Chile. A 9 miles long branch runs to Freirina, where gold, copper and manganese are mined in a small way. A 7 miles long branch runs from Vallenar to Agua Amarga silver mine, and another to the Santa Rosa copper mines.

A few miles south of Husaco, we pass Chanaral Island *light* (not to be confounded with Chanaral port), one flash every 6 seconds, visible 14 miles.

Cruz Grande, 130 miles north of Valparaiso, is the most important new port development on the west coast. The Bethlehem Steel Company purchased the Tofo iron mines from a French Company. They consist in the main in a mountain of hematite iron ore, only 15 kilometres from the sea shore. The company has spent considerable money in improvements, but at present no ore is shipped.

About 25 miles north of Coquimbo, some 12 miles off shore, we pass the *Pajaros Islets* 100 and 150 feet high respectively. On one of them, in Lat. 29.34, is a *light* exhibited 148 feet above water, flashing 2 seconds every 20 seconds, visible 14 miles.

THE END OF THE ARID ZONE

Coquimbo, 200 miles north of Valparaiso, is a port and town of considerable importance, serving as gateway for La Serena, just "next door" to it, also on the sea shore, but on a sandy beach unsuitable for shipping. Both towns together have a population of nearly 50,000. In contrast with other Chilean ports and towns we have passed thus far, Coquimbo-La Serena are very hilly and located at the foot and up cliffs.

Gold, silver, cobalt, copper, manganese and some iron are shipped from Coquimbo. The famous placer

mines of Andacallo are located some 28 miles away and in the district are also the famous shrines of the same name, visited annually at the feast of the Rosary, by thousands of pilgrims, even from Argentina and Bolivia.

Ovalle, a city of 17,000 inhabitants, in the Limari valley, the capital of the Department of the same name, is connected with Coquimbo by a 70 miles long railroad.

When coming from the north, the region of Coquimbo is the first where it rains regularly. During the winter months, several heavy showers take place. While, during the summer, the country appears as arid as that we have just passed, a few days after the first rain everything becomes green almost suddenly. The precipitation often reaches 12 inches and even more in two days.

Coquimbo *light*, one flash every 2 seconds, is visible 10 miles.

La Serena is one of the oldest towns in Chile, having been founded in 1544. It has retained the character of an old Spanish town, with quaint old buildings and a stately cathedral. It is favored with a fresh water supply from the Itaca River. A pretty trip by rail is up the Elqui Valley, picturesque by comparison, and the center of a great wine industry. Only two miles from La Serena are the Brillador Copper mines, and 80 miles further the Panulcillo copper mines.

Guayaquan is from a custom point of view, but not geographically, a port different from Coquimbo. It serves a copper smelter and the first sulphuric acid plant established in Chile.

Tongoi a few miles south of Coquimbo, is the shipping point for a smelter and copper mines in the interior.

Lengua de Vaca Point *Light*, near Tongoi Bay, 41 miles south of Coquimbo, 2 flashes every 30 seconds, visible 16 miles.

Penitente Rock *Light*, 2 flashes every 6 seconds, visible 12 miles, located in Lat. 31.52.

Huevos Island *Light*, 64 miles north of Valparaiso, shows one flash every 2 seconds. Although a light of the 6th order, it is visible 10 miles.

Valparaiso approaches may easily be recognized. When about two hours out, we pass low brown cliffs, followed by a white beach, with more low brown cliffs following. Later we have again a sandy beach and a small bay and then reddish cliffs which are 5 miles from Valparaiso.

Valparaiso *Light*, a group of three short flashes, showing every 30 seconds, is visible 15 miles.

“EL PUERTO”

Valparaiso, the principal port and second city of Chile is located at about the same latitude as Santiago, Buenos Ayres and Montevideo, on the beautiful semi-circular bay of Almendral. It is well sheltered except towards the north but, during the winter months, when the trades blow from the northeast, ships riding in the harbor are often exposed to a heavy rolling sea. Port works to cost many millions were begun before the war. The difficulty in making Valparaiso a better port is the great depth of the water to within a few yards of the shore.

The population of Valparaiso, given at 280,000 is more cosmopolitan than that of other cities of the West Coast and it differs much also in characteristics from other Latin American cities. Many writers say that the “manana” rule prevails here as well as elsewhere and joke more or less funnily about the difference of “ora inglesa” and “ora Chilena” when making appointments. Nevertheless, the stranger landing here cannot fail to notice a hustle and bustle unknown elsewhere in Latin American countries.

The only first class hotel in Valparaiso is the Royal, Calle Esmeraldas, under the same management as the Savoy and the Grand in Santiago.

Much of Valparaiso was destroyed by an earthquake on August 15, 1906.

“Down Town” Valparaiso has been partly built on

fills, whereby the level of Almendral Beach has been raised from 12 to 20 feet. Above the lower town, rises the upper city amphitheater-like, the ground cut up by deep gullies leaving numerous hills and hummocks between them.

Communications between the various parts of the upper town are difficult, but much has been done to overcome the difficulties caused by local topography. Several cable railways connect the lower with the upper city. Circular roads have been built connecting several hills with one another and much masonry work has been done to prevent slides and erosion.

A BEAUTIFUL CITY

Santiago, the capital and largest city, lies in the Valley of the Mapocho, at 555 metres (1821 feet) altitude, 188 kilometres (117 miles) from Valparaiso by rail. Its area, bordered on the one side by the coast range and on the other by the majestic Andes, snow capped for the greater part of the year, can boast of a very agreeable, equable climate, without extremes of heat and cold and with comparatively few rainy or cloudy days.

The area of the city is about 16 square miles, and in laying it out the block gridiron method, modified by local requirements, has been adhered to.

Santiago is third in size among Latin American cities, with 600,000 inhabitants. It may also justly

be claimed to be one of the three cleanest and most beautiful large cities of the New World and of the World, remarkable improvements having been accomplished during the last few years both as concerns adornments and elimination of ugly spots. Moreover, no city in the World has, proportionally as great an area of beautiful public parks.

The three principal hotels rank in the order named: The Savoy, new, is one of the very best hotels in South America, European plan only. The Grand Hotel has American plan only, while the Odo, the oldest of the three has European Plan only. The best restaurants are the Santiago in Calle Huerfanos and the Savoy, Calle Agustinas.

NOT ROBINSON'S ISLAND

Chile possesses far from its shores a number of islands two of which are of unusual interest.

Juan Fernandez, 370 miles west of Valparaiso is the island where, two centuries ago, the mutined sailor Selkirk was cast away.

Daniel Defoe took his lonely life for the theme of his Robinson Crusoe, but it has now been well established that the scene of the famous novel was laid on Tobago, an island north of Trinidad, British W. I., which Defoe knew well, and not on Juan Fernandez.

Juan Fernandez is 13 miles long and 4 miles at its widest. Some of its valleys are very fertile, but the

only important agricultural industry is cattle and pig raising.

The Chilean Government maintains a light house and a wireless station on the island; a small steamer plies monthly around the island and maintains means of communications with Valparaiso.

A tablet at the Government House, commemorates Juan Fernandez first Colonist the sailor Selkirk.

Easter Island lies north and west of Juan Fernandez. It is interesting especially because of the carved statues, many of them of large size, found scattered all over the island. They are, in character, unlike any other monuments found anywhere in the world and they apparently were left there by an unknown race for unknown reasons.

Chile possesses several other islands in the Pacific. None of them of importance, either economically or from a strategic point of view. Nevertheless, Chile is very jealous of their possession and she never fails to assert her authority over them, whenever there is a tendency to dispute it.

CHAPTER XII

MINERAL RESOURCES AND MINING

The prosperity of Chile is today—and for many years will continue to be—largely dependent upon the development of its mineral wealth, of which an American geologist, Wm. G. H. Wilson, recently said: “I do not think I am mistaken when I say that Chile is the richest country in the world, in a mineral sense. Chileans do not know what they possess.” Indeed, what has been said of Colombia applies also to Chile, namely, that almost every known variety of mineral is found in the territory of the Republic, while two of them, nitrates and copper, are mined on a larger scale than anywhere else in the world.

Mining in Chile dates back to the time, and even before the time, when the aborigenes paid their tribute to the Peruvian Incas in gold, which was then, probably, the only mineral mined. During the period of Spanish rule, it is probable that only gold, silver and mercury were mined and it remained for Chileans, with the aid of foreign capital and foreign engineering ex-

perience, to create mining industry in the aggregate larger than that of any other country of the same size.

INDUCEMENTS TO CAPITAL

Unlike other Latin-American countries, Chile has refrained from placing a direct tax on the mining of metals as it does upon the exports of nitrates.

The idea was that nitrates are without competition while that a tax upon the production of various metals concerning which other countries compete with Chile, would repel instead of attracting foreign capital and enterprise.

The quantity and the value of the mineral production of Chile, in 1918, is indicated in the following table. Values indicated are in pesos *gold*, of a value of about 35c American.

	Quantities	Value
Nitrates.....	2,859,303 tons	\$500,378,025
Copper.....	106,813	132,765,586
Coal.....	1,516,524	106,156,680
Iodin.....	1,078,760 kilos	17,864,266
Silver.....	47,231	3,752,883
Gold.....	1,938	2,178,764
Sulphur.....	19,557 tons	3,129,120
Borax.....	6,603	1,320,600
Lime.....	105,743	1,586,145
Salt.....	54,536	1,908,760
Guano.....	15,000	600,000

Nitrates form the principal source of Chile's natural wealth and produce the largest part of the revenue of its Government.

The nitrate zone embraces an area of some 450 miles from one end to the other, at distances from the sea varying from 15 to 93 miles and at an elevation of from 3,000 to 10,000 feet above sea level. The deposits are always in rainless, arid plains where—although nitrates are an essential element of plant food—vegetation is absent. The nitrate belt varies in width from 1-1-2 mile, in the province of Tarapaca to, in places, as much as 30 miles in the region of Taltal, the richest grounds found thus far being on a low slope rising from the Pampa de Tamarugal towards the west.

There has been much speculation, in scientific circles, how such important deposits of nitrates could have accumulated within such a small area. The prevailing explanation is that, before rains ceased to fall in the region, peculiar climatic conditions must have prevailed there. Unusually frequent and powerful flashes of lightning caused the nitrogen and the oxygen of the air to combine, forming nitric acid. This found sodium sulphate, which was and is still abundant in the region. Because of the greater affinity of nitrogen for sodium than for sulphur, the latter was freed, and liberated in a gaseous compound, leaving the solid sodium nitrate.

All of the nitrates of Chile are exported, and it is said that the visible deposits are large enough to fully

supply the demand of the world for many decades to come.

It is only recently that Americans began to interest themselves in the development of nitrate properties. The largest American activities being thus far the Dupont Powder Company, which has acquired several deposits and is beginning to develop them systematically.

THE NITRATE TRUST

Since the re-entry early in 1921 of the German producers into the Nitrate Producers Association, this organization has been much strengthened and it now controls 98% of the national output.

The nationality of operating companies and the percentages of production allotted each by the Association of Nitrate Producers is indicated in the following table:

Nationality		Production in tons	%
Chilean	60	1,435,607	50,21%
British	43	1,028,238	35,96
Spanish	3	51,681	1,81
German	2	17,940	0,63
Peruvian	7	77,291	2,74
North American	2	78,876	2,72
Jugo-Slav	7	168,204	5,58
Japanese	1	1,466	0,05
Totals	125	2,859,203	100,00%

Up to the end of 1918, the nitrate industry employed 56,981 persons. The coal consumed amounted to 319,613 tons, the fuel oil 445,890 tons.

The nitrate bearing material lies close to the surface of the ground, being merely covered with a foot or so of debris. There are three classes of material bearing the nitrate of soda. The first and most important of these is the "caliche" which formerly was the only one exploited. The second, called "costra" is a layer of conglomerate covering the caliche. Mixed up with and between the layers of costra and caliche are pockets and veins of earth which also contain varying proportions of nitrates. The layers of caliche are very irregular.

The process of separating the nitrate from waste materials is quite simple. It consists in the main in boiling the material with steam and crystalizing at differentiated temperatures and degrees of concentration of the brine, whereby the different minerals in solution in the brine are separated.

On the first discovery of the value of Chile nitrates as a fertilizer, the crude material, as mined in Chile, was spread over the ground, but it was soon found more profitable to export a purer mineral.

During and since the War, nitrate interests were alarmed at the prospect of a destructive competition by nitrates obtained from the air in Norway, Switzerland and elsewhere. This has led to more economical methods of both mining and refining, in which the

Government of Chile has taken an active interest. As a matter of fact, the Government has taken effective measures to prevent irrational exploitation.

Potassium nitrate and iodine are obtained in considerable quantities as a by-product of the sodium nitrate industry.

The nitrate producers of Chile are organized in an association with headquarters in Valparaiso, for the purpose of regulating the industry, of devising better methods of production, of opening new markets and systematizing propaganda abroad.

Copper leads among the metals mined in Chile, and indeed, the two largest copper plants in the world as concerns the quantity of ore treated, are located in that country. The four largest copper concerns in Chile are American.

COPPER MINING MAINLY AMERICAN

The Chile Exploration Company, operates a very large plant at Chuquicamata near Calama, on a branch of the Antofagasta-Bolivia Railway. It is 70 miles from the Bolivian border, at an elevation of nearly 10,000 feet. The mining is in the open, power shovels, both steam and electric, loading cars let down by gravity to the plant below. The ore, containing only from 2 to 3% metallic copper, is the lowest grade profitably exploited anywhere in the world. However, it is self-leaching, no sulphuric acid being needed in the

process of precipitating the metal. It is interesting to note that the electric power plant of the Company is located in Tocopilla, on the coast, the current being carried across country at 110,000 volts.

The Braden Copper Company, operates a group of mines near Sewell, not far from Rancagua, south of Santiago.

A third American copper concern is the Andes Copper Mining Company interested especially in deposits east of Chanaral, in the province of Atacama, and a fourth, the Santiago Mining Company, capitalized at 10 million dollars, operates deposits located only 10 miles from Santiago. These four and other smaller American concerns are all said to be affiliated with the Guggenheim interests, which are said to control over two thirds of the Copper production in Chile.

STEEL INDUSTRY FAILED

Chile is rich in *iron deposit*. In 1910, the Government gave a concession to a French Company which established a smelter at Corral, near Valdivia and for a time it was hoped that Chile would become one of the great steel manufacturing countries of the World. Two blast furnaces were constructed at a cost of \$3,000,000, and a railway was built to the forests donated by the government as a source of fuel supply. The wood was feed into the furnaces at the plant by what is known as the Prudhomme process. This method works

the deposits, which looked very promising on the surface, proved to be only of low depth and they soon gave out entirely. Nevertheless, before operations ceased, two years later, sufficient ore was obtained to pay back a large part of the original investment.

Silver mining is not carried on a large scale. Most of the silver produced is a by-product of copper smelting.

The *sulphur* mining industry of Chile dates back to the early days of nitrate workings, to the forties of the last century and for many years all the sulphur required in the manufacture of blasting powder needed to break up the nitrate ground was supplied by native deposits.

Most of the sulphur of Chile is found east of the nitrate belt, but usually at much higher altitudes, often 16 to 17,000 feet. The principal mine is the Buenaventura, near Ollague, on the Antofagasta and Bolivia Railway line. at an altitude of 12,000 feet. Second in importance is that of Tacora, near the Arica-Lapaz Railroad, at 13,500 feet altitude. The total annual production is less than 15,000 tons. Distance of many deposits from means of communications prevents their successful exploitation.

The largest *borax* deposits in the world are the famous borax lake of Ascotan, on the Antofagasta and

ever, the domestic production does not nearly cover the demand. Cheap coal imports into Chile are facilitated by the fact that vessels coming to the north coast to get nitrate usually take on the outward voyage a cargo of coal as ballast. Chilean coal mining interests have often urged the imposition of a heavy duty upon imported coal.

The coal fields of Chile are mainly located in the south central and southern sections of the country. The largest and these under the most intensive exploitation are in the vicinity of Concepcion. Other deposits are found in the island of Chiloe and as far south as Punta Arenas. A feature of Chile's known coal deposits is that they are all near the coast and of available means of communication.

The majority of the coal companies are concerns financed entirely locally.

Gold has been mined in Chile since prehistoric times, and there are now over 3000 registered gold mining claims located from the northernmost province to as far south as the Tierra del Fuego. However, the total quantity mined is comparatively small.

In 1911 what was believed to be a great find was opened at Paru, near Constitution, south of Santiago. A company obtained the concession of that mine and the prospects were so good that a wild rush took place for the purchase of its stock. Some shares are said to have changed hands with a 220% advance. However,

well with wood containing less than 25% moisture while newly cut wood of the region was found to contain over 50% moisture. Months of drying proved insufficient to reduce that percentage sufficiently low. Moreover, the wood was found too low in caloric power. Operation having proved unrenumerative, the plant was closed in 1911.

Another large iron concession, also organized by the French, the Societe des Hauts Fournaux, Forges et Acieries du Chile, at Tofo. near the port of Cruz Grande, 30 miles north of Coquimbo, also proved a failure. The deposits consist of two peaks about 3000 feet high, called Cerro Norte and Cerro Sur, located only 8 kilometres inland, which have been found to consist almost entirely of ore containing 68 to 70% metallic iron, with only $\frac{1}{2}\%$ phosphorus.

During the war the Bethlehem Steel Co. obtained a 90 years lease on the property, and it has since spent large sums in making the mine ready for operation and in creating a commodious port with modern loading facilities at Cruz Grande. However, thus far, operation has been only on a very small scale.

There are many other known iron deposits, mainly in the northern desert but none is as important nor as accessible as the two just mentioned.

COAL MINING PROMISING

Chile is the only South American country where coal is mined commercially in appreciable quantities. How-

Bolivia Railways Line, at 12,200 feet altitude. The lake is 24 miles long, of varying width and covered with a crust of borax of an average of 8 feet thickness, the deposits are controlled by the Borax Consolidated, Ltd. of London.

Salt deposits abound in Chile, but of 400 mining claims only a dozen or so are worked sufficiently to cover the domestic demand.

Petroleum has been located in various sections of Chile but only in a very few cases has the exploitability of the fields been demonstrated. The most promising areas are those near Punta Arenas and on the island of Chiloe. Characteristic of the oil situation in Chile is that, during the last few years, the number of registered claims has decreased by almost a thousand.

CHAPTER XIII

TOPOGRAPHY

Although having no frontage on the Pacific, Bolivia is counted as one to the Western Countries. Moreover, a considerable proportion of the passenger and freight traffic along the West Coast is to and from Bolivia. Hence a monography of that country has been included in this volume.

Bolivia is the third largest South American country, ranking after Brazil and Argentina. Its area is 1,834,225 square kilometres (708,195 sq. m.). In area it is ten times larger than the State of Illinois, but in population it is less than Chicago, namely 2,505,536 (Census 1914). It is the most sparsely settled South American country with 3.2 inhabitants to the square mile, compared with 23.2 in the United States.

The most notable topographical feature of Bolivia is the Altiplano, the great Central Plateau of 40,000 sq. m. area, which extends for 500 miles at an average altitude of 12,000 feet between the two main Andean chains which traverse the country north and south.

which put an end to the hostilities between the followers of Pizarro and those of Almagro. Later, it was given its present full name, **La Paz de Ayacucho**, in commemoration of the great battle of Ayacucho during the Wars against Spain, which sealed the independence of West Coast Countries.

The situation of La Paz is peculiar—deep in a sudden, curious depression of the tableland above, on both sides of the river Chuquiapu. The narrow, quaint streets, thronged with Indian men and women dressed in variagated colors, either bending under heavy loads or leading flocks of black, white or reddish colored llamas. Cholo women, with their white hats looking like glazed Panamas, and their immaculately white, heavily starched garb, with a sprinkling of nuns and monks, of modern men in silk hat and of smart soldiers wearing German-cut uniforms the whole dotted with numerous beautiful public squares and gardens, is a sight which, in its variety, can hardly be surpassed in the world.

The neighborhood of La Paz presents quite as great a variety of view. The awe inspiring Illimani, 21,000 feet high, is near. A thousand feet below, but only four miles away are the gorges of Obraje which in the curious shape of the rocks and in colorfulness rival Yosemite Valley. Near La Paz are, almost side by side, airidity and barrenness, and intense agriculture. Near lake Titicaca the famous ruins of Tiahuanaco.

La Paz has a population of 86,743. It is the most

65 at its widest covering an area of 5187 miles at an altitude of 12,545 feet, about equally divided between Peruvian and Bolivian Territory. The Southern Railways of Peru, a Peruvian Corporation subsidiary, maintain a steamer service, a 1100 ton vessel, the Inca, serves as connecting link between the Peruvian and Bolivian Railways, smaller steamers providing service around the Lake.

Besides Bolivia, only Paraguay, among the countries of the Western Hemisphere has no Ocean front. Antofagasta, and the adjacent coast having been ceded to Chile after the war of 1878. Three Pacific outlets are available to Bolivia, namely at Mollendo, Arica and Antofagasta. There are two main outlets via the Amazon, namely the Beni and the Mamore River, an American built railroad connecting the Mamore River with Porto Velho, Brazil, where the Madera River becomes navigable. The southeastern territories find their outlet via Argentina, in part by an as yet incomplete railroad line from Uyuni, Bolivia, to Salta, Argentina.

BOLIVIAN CITIES

La Paz is considered the Capital of Bolivia, the President and the Government being established there. However, the constitutional Capital is at Sucre.

La Paz was founded in Conquistadores times and called thus (The Peace) in honor of an agreement

Three of the highest peaks of the Western Hemisphere, the Volcanoes Illimani, Illampu and Sajama are on Bolivian territory.

Bolivia may be divided into three distinct zones. The Altiplano just named, with the Cordillera framing it, is the smaller of these three zones, but that most highly developed, most thickly populated and that where all important cities are located.

The second zone, that of the Amazon, is the largest and probably better known and a little more developed than the similar zone of Peru. The third zone, the southeast territories of Santa Cruz, Chuquisaca and Tarija, ending in a triangle which borders Brazil, Paraguay and Argentine is probably the most fertile. In recent years, it is the only part of Bolivia which has received an appreciable foreign immigration, mostly Italians coming via Argentina.

Bolivia has a large net of navigable rivers, the principal of which are the Itenes, the Beni, and the Mamore. All Bolivian Rivers flow into the Amazon region, except one, the Desaguadero. It is a very remarkable natural canal, improved by both ancient Inca and modern man, connecting Lake Titicaca with Lake Aullaga, also called Lake Poopo, which subsequently empties into the Pilcomayo and finally into the Rio de la Plata. A line of small steamers provides regular services on the Desaguadero.

Lake Titicaca, the largest, highest and most interesting lake in South America is 120 miles long and

important commercial center of Bolivia and especially the distributing point for a vast surrounding territory.

Cochabamba the second city of the Republic in population, is believed by many to have the greatest future and indeed, in spite of adverse economic conditions, it has begun to grow appreciably since the opening of the Railroad from Oruro. It is located in a fine, fertile valley, the center of a very rich country, drawing its trade both from the altiplano and the Amazon region. It is the most Old Spanish of all Bolivian cities and its 30,000 inhabitants include a number of old patrician families very proud of their ancestry.

Potosi is one of the highest cities in the World, its altitude being 4,466 metres (13,661 feet).

It is famous for the richness of its silver mines, having during Spanish Dominion, produced silver to the amount of more than three thousand six hundred million dollars. The city was founded in 1545 and, fifty years later, the population reached 160,000 inhabitants. There are still in use some of the big dams and aqueducts which the Spaniards constructed to supply the city with water. Among the most interesting buildings is the mint, constructed in 1773 at a cost of \$1,100,000.

Potosi is on a branch Railroad of the Bolivian Railways.

Sucre, a city of nearly 30,000 inhabitants, is the nominal Capital of Bolivia, but the only important Federal institution established there is the Supreme Court. It is an old fashioned town, mixed with modern mining and manufacturing in a small way. A railroad is being built from Potosi which will not only increase the importance of Sucre, but help the development of the department of Chuquisaca, and also of the south-east provinces.

Oruro is, next to La Paz, the most important railroad center of Bolivia. It is, moreover, the trading center for the largest tin mines of the country and the home town of the wealthiest Bolivian, who, however, resides in Paris.

Trinidad, at the head of navigation of the Mamore River, is the capital of the Beni and the center of an empire in being and in miniature. There, in the midst of almost wilderness, three weeks from anywhere is lost an appreciable white population—some old Spanish descent, and some new immigration—in the midst of a purely Indian population and an almost virgin country.

Santa Cruz, in the southeast, is becoming an important oil town. **Tupiza** has gained much since the partial opening of the Buenos Ayres La Pas Railroad.

THE PEOPLE

Of the population of 2,550,538 estimated by the 1914 census, two-thirds are given as Indians, half a million as Cholos—or of mixed blood, and about quarter of a million as whites, among them some 7000 foreigners.

However, in Bolivia, as in several other Latin American countries, "white" indicates a class distinction rather than one of race. Except in the Amazon region and to a lesser extent in the southeastern territories, the Indians are mostly engaged in agricultural pursuits or working the mines, while the Cholos are artisans and small shopkeepers.

The whites, the Cholos and the Indians have no social relations with one another and the two main races of Indians, the Quetchuas and the Aymaraes are rarely on speaking terms.

Spanish is the official language of the country and that of the educated portion of the people, but both the Indians and the Cholos prefer their own languages and many do not understand anything else. The Spaniards had no difficulties in conquering the Indians and to force them to work, and even to accept the forms of the catholic religion, but four centuries have not sufficed to force the Indian to accept the Spanish speech. Even the Indians who have attended school forget the Spanish they have learned a year or two afterwards.

The Bolivian Indian, as a whole, has little or no political power and does not care for any. For as long as the Government leaves him alone and does not burden him with taxation, he does not care who's who in the Government Palaces. As a matter of fact, the Quechua Indian rarely refers to himself as a Bolivian he is above all a Quechua, while the Aymara never admits being Bolivian.

The environments naturally have deeply influenced the racial characteristics of the Bolivian Indian. The effect of the gloomy aspect of the altiplano and of the mountains; without aesthetic surroundings, living in dry air surcharged with electricity; the rare oxygen, the burning noon sun and the very cold nights all have contributed in making for vigor and hardiness and lead to stability of thought process, manifested in the highest type of intellect, when it has an opportunity to develop itself.

AGRICULTURE

Bolivia does not export any of the cultivated products of the soil. Its high plateau produces barely enough to support the few wants of its population, and the Eastern territories and provinces are, as yet, not developed agriculturally.

The only agricultural exports are confined to some of the products of the vast forests of the Amazon

region—mainly rubber and medicinal plants—with some wool, hides and skins from the Altiplano.

Rubber is next to tin the most important item of Bolivia's foreign trade. Its production, in recent years having far exceeded \$5,000,000 annually. It is the chief product of the department of Colonias in the extreme north and of that of Beni. Bolivian rubber is said to be the highest grade obtained in South America, but as it is exported almost exclusively via the Amazon, it is generally known as Para rubber. The principal rubber shipping point is Riberalta, from which it is a three to five weeks trip to Para, with various transbording of the rubber. The exploitation of rubber lands is regulated by law, the bleeding being restricted to two and six bleedings, respectively, according to variety, to be followed by similar periods of rest.

The Bolivian rubber laws are said to be better enforced than those of neighboring States.

The Departments of Cochabamba, and Chuquisaca are the chief agricultural sections of Bolivia, and their soil is very fertile and the climate favorable to the production of grain and vegetables. In Cochabamba, coffee and cocoa are produced besides cereals, in Chuquisaca considerable quantities of rice. Several departments produce potatoes which are dried and called "chuno" and are used as a substitute for wheat flour.

The Eastern Provinces are susceptible of producing all or most tropical crops, but are awaiting immigration and better means of transportation.

On the shores of Lake Titicaca and in the near-by valleys are located some of the finest grazing lands of South America. Where cattle raising has been tried, it has proven successful, while this part of Bolivia is better adapted for sheep raising than Australia. Land values are very low and labor is cheap and plentiful. The quality of sheep raised there is low and agricultural methods are those of a thousand years ago, but modern methods adapted to local conditions would produce big returns.

The immigration laws of Bolivia are very liberal and designed to attract both the individual immigrant and the capitalist desirous of exploiting the agricultural possibilities of the land on a larger scale. Each immigrant can obtain 50 hectares (120 acres) from the Government at 10 centavos gold (not quite 4 cents American) per hectare. Not more than three such lots being allowed to each immigrant. The only other requirement is that the lands be surveyed at the expense of the immigrant and that the land be actually occupied by the immigrant or his agent. Any one not an immigrant may acquire as many as 20,000 hectares of Government land at the same price, provided at least one family be settled on each 1000 hectare, who actually cultivate parts of the land.

MINERAL WEALTH

"Bolivia is a table of silver, supported by columns of gold," said an explorer, Raimondi. Not only is Bolivia one of the richest countries, but more than any other nation in the world, its economic life is based upon the development of its mineral resources. During the last few years minerals formed from 82 to 88% of its total exports.

After the independence of Bolivia had been achieved the mining industry fell into a state of decay, from which it did not fully emerge until a few years ago. The land was strewn with thousands of abandoned mines and workings, and such development as was carried on was handled in a haphazard way. The construction of railways into the Republic and the endeavors of a thoroughly enlightened Government gradually put the industry on a firm foundation, and there is every prospect of continued progress.

But though Bolivia is immensely rich. Development has been very seriously handicapped by various circumstances, and there has been little mining done systematically until about ten years ago.

The principal of these handicaps is the character of the country. Many of the richest deposits are located three miles and even more towards the sky, far away from means of communications and habitations. This not only increase considerably the cost of opening a mine, but as well of shipping the mined product. Then

there is lack of water and of fuel and in many places of labor, especially of native mechanics.

Yet, in spite of these difficulties, Bolivia has during the war, taken second rank (coming after the Malay States) among producers of *tin*. The tin zone in Bolivia is divided into four districts—La Paz in the north, Oruro in the center, Chorolque in the south, and Potosi in the east. The city of Oruro is the tin metropolis and commercial center of the industry. The mining country is much in the Cordillera Real Range, and the lodes are found at altitudes of from 11,000 to 16,000 feet, the height of one in the Monte Blanco mining section, where the offices of the company are, being 14,500 feet above the level of the sea.

For a time, Bolivia stood third among *silver* producing countries of the World, and the metal is found in almost every part of the Republic. The silver hills of Potosi and Oruro furnished much of the wealth which the Spanish galleons took across the seas, and fabulous tales have been told of the amounts of the precious metal obtained from the famous Cerro Rico of Potosi, which is said to have reached two billion dollars worth of silver.

Already before the War, the *tungsten* deposits of Bolivia had attracted considerable attention. This ore is found in widely scattered areas, but most of the development has taken place in the Santa Cruz district and to a lesser extent in the neighborhood of Uyuni. The tungsten mining industry of Bolivia has

suffered more than any other from the effects of post-war conditions.

The Republic occupies a prominent place among the very few *bismuth* producing countries, said to be three in all. The world mining of this metal is in the hands of a monopoly.

It is said that the Bolivian *copper* mines produce a higher quality of ore than any other South American country. The ore of the Corbcoco mines are said to resemble greatly those of north Michigan, at Calumet, Hecla and Copper Range. Unlike in Chile, copper mining in Bolivia is mainly in the hands of the British United Copper, Ltd.

Antimony was extensively mined during the War, but high freights have caused production to cease. *Zinc* is produced on a small scale. *Lead* is present in considerable proportion, but too far from means of transportation to be interesting. Vast *Molybdenum* deposits are known to exist but not where they can be profitably exploited.

From 1540 to 1750, a period of 210 years, the *gold* mines of Bolivia produced \$2,100,000,000. From 1750 to the beginning of the nineteenth century the mines and placers situated in the Provinces of Larecaja and Caupolican produced \$14,000,000 gold, and from 1818

to 1868 the output was valued at about \$3,000,000. The product of the other mines and placers of the nation, from the middle of the eighteenth to the latter part of the nineteenth century, is estimated at \$125,000,000. but at present the annual production of Bolivia is considerably less than half a million dollars worth.

A number of Bolivian Rivers carry *gold*, and it is not an uncommon sight to see natives, after the high waters of certain seasons have subsided, scratching in stream beds for specks of gold, which they frequently find.

Deposits in which gold exists are found in three different regions of the country, all of which are vast in extent. One of these belts begins in the Province of Munecas and extends eastward toward the Paraguay; another belt lies in the southwest of Tupiza region; while a third gold area is known as the Acre section, in northern Bolivia.

In many cases the virgin country, often without roads or even a good trail, prevents the introduction of modern machinery, without which in this age few mining enterprises are profitable.

Coal is found in fair quantities near Carabuco, the strata covering the hills over an area of more than 4 miles. Some years ago an American company secured a concession to work these mines and invested con-

siderable capital in the enterprise. Several hundred tons were mined, and the coal was experimented with by the Peruvian Corporation in its steamers—with disastrous results, however, it being found that the coal was intermixed with large quantities of sulphur and other impurities.

At one time, considerable impetus also was given to the development of large deposits in the Copocabana Peninsula, on the Bolivian side of Lake Titicaca, and also to the exploitation of two veins near Cochabamba, but the total production of the country is negligible.

VAST OIL DEPOSITS

During the last two years, vast petroleum fields have been determined in Southern Bolivia, and they promise to be very interesting.

The *Bolivian* fields appear to be a continuation of those of northern Argentina or, as locally spoken of, the “sistema de Salta,” and the deposits follow the eastern Andean foothills for many miles, possibly as far north as the city of Santa Cruz. Bolivian and other engineers and geologists within the last few years have made a deep study of the *petroleum* outcroppings, not only in eastern Bolivia but also in the Lake Titicaca region.

At one time, newspapers reported that a French Syndicate had been formed for the exploitation of the Bolivian fields. Later, it was claimed that they were

controlled by a Chilean Syndicate. However, in 1920, the Bolivian Government decreed a petroleum monopoly.

In the province of Santa Cruz, the oil yield is said to be of a quality far superior to that found in any other region; owing to some peculiar geological formation, the oil reaches the earth's surface so clarified that with very primitive refining process it is used by the natives for illuminating purposes, and there are instances where it was burned just as taken from the filtration, without being in the slightest degree refined. This petroleum, burned in a lamp without a chimney in the open air, was quite devoid of odor.

SOME STRANGE FUELS

Owing to the high price of coal, the principal fuel used on the railroads and in the mining industry of the Altiplano is "*yareta*," a plant, or lichen of the genus *Azorella*. It grows on the rocky slopes of the mountains up to 16,000 feet above sea level. In general shape it suggests heads of coral growing upon and conforming to the configuration of the rocks. Some of the masses are as much as 4 feet in diameter and 1½ feet thick. After being detached from the rocks it is piled up to dry for a short time before being used. On account of a large amount of resinous material it burns readily.

Another fuel, used not only by the Indians, but also

in towns for cooking, and even in the La Paz brewery is *Takia*, or dried *llama dung*. Still another fuel is a shrub called *tola*, which grows about a metre high and covers the plains in many points.

MEANS OF COMMUNICATION

Although Bolivia has no coast line, its interior may be nearly as easily reached by rail than similarly located parts of Peru. Rail connection exists with three Pacific ports, Mollendo, Arica and Antofagasta. A Railroad outlet to Argentina and Buenos Ayres is nearly completed, while the Atlantic Ocean may be reached via the Mambre-Porto Velho Railway and the Amazon.

The Arica-La Paz Railroad is the shortest route from the Pacific to La Paz, but, for various reasons, it has had to contend with many difficulties. Its equipment is far from adequate and congestion has been chronic almost from the moment of its opening.

The line is 281 miles long, 28 miles of which with center rack of the Abt system, slightly over half of the line being on Bolivian territory.

The up trains require 22 hours to La Paz, the down trains 18 hours to Arica. The single first-class fare is about \$15 American gold.

The second important railroad gate of Bolivia is from *Mollendo*, via *Arequipa*, *Puno*, *Lake Titicaca*, and *Guaqui* to *La Paz*. This line is 534 miles long,

and is entirely controlled by the Southern Railways of Peru, a subsidiary of the Peruvian Corporation.

The journey includes a sail across the Lake Titicaca. This lake is situated at an altitude of 3,931 metres (12,500 feet) and an area of 4000 square miles, or larger than all the lakes of Switzerland put together. In many places the depth of the water is more than 1,000 feet. Across this vast extent of water, passengers and freight are carried from Puno to Guaqui on the Bolivian side, a distance of 110 miles, by powerful steamers of 1,000 tons register, equipped with every provision for accommodation and comfort.

A daylight trip across the lake, the highest navigable body of water in the world, is one which should be made, if possible for the traveler will carry away with him an impression never to be forgotten.

A regular line of steamers is maintained from Puno, Peru, to Guaqui, Bolivia, 160 miles on the other side of the Lake. From Guaqui a 60 miles long line, 6 of which from Alto de LaPaz to La Paz, 1000 feet below, is electric.

This line was owned by the Government, but was sold to the Peruvian Corporation in 1910 to provide funds for the building of the Potosi-Sucre line.

THE BOLIVIAN RAILWAYS

The Antofagasta and Bolivia Railway begins at Antofagasta, Chile, and runs to Ollague on the frontier,

and thence to Oruro, where connection is made with the Bolivian Railway, which continues on to Viacha, the junction point with the Guaqui & La Paz Railway thus forming a through route from the Pacific to the Bolivian capital a total distance of 1,157 kilometres (719 miles). A change is required to be made on the heights above La Paz, the last few miles of the line being operated by electric in place of steam power. This whole system is known as the Antofagasta & Bolivia Railway, and it runs through some of the finest Andean scenery in South America. The main line is carried to a height of 13,000 feet (about 4,000 metres) above sea level, and one of its branch lines, the Uyuni Huanchaca Railway, reaches the altitude of 4819 metres or 15,809 feet, or only a few feet less than the highest Peruvian Railroad.

The Antofagasta & Bolivia Railway was built originally to provide an outlet for the nitrate properties of the Compania Salitres de Antofagasta. No outlet existing for the mineral products of the Huanchaca Mine, located at Huanchaca, near Uyuni, Bolivia, the owners of the mine purchased the railway. This was in 1884. The line was completed as far as Uyuni in the year 1888. In 1889 the property was disposed of to the present company for approximately \$10,000,000. The road was continued to Oruro in 1892, and from that time began an expansion of earnings and profits. Today the railway is one of the best managed and most profitable in South America. It has taken over, under

lease, the Bolivia Railway, and now presents a through route between La Paz, Potosi, Oruro, and other important Bolivian cities and the Pacific ports of Antofagasta and Mejillones.

One of the newer Railroads of Bolivia is the Oruro-Cochabamba line, which opens a very fertile and minerally rich country. It is expected that the Potosi-Sucre line will be completed in 1921 and the La Paz Yungas line in 1922 or the following year.

A TRANSANDEAN LINE

A most important railroad line, also nearing completion is the La Quiaca-Tupiza Railway, funds for which were largely raised by means of a loan obtained in France in 1913, and for which contract was let to the Vesin Syndicate, in Paris. The line, 200 kilometres, or 124 miles long will connect the Bolivian with the Argentine Railways and the ride from La Paz to Buenos Ayres will consume only four days.

THE ONLY LARGE SOUTH AMERICAN CANALS

The Desaguadero, between Lake Titicaca and Lake Poopo is a wonderful canal, mostly natural, which needed little work to render it navigable.

Another Canal is projected by an organization of Italian, Belgian, and Argentinian capital has been formed in Nazareno, Bolivia, situated on the slope of

the Tupiza valley, 60 kilometres from La Quiaca, the object of which is the construction of a navigable irrigating canal connecting Nazareno and Salta, Argentina. The canal will follow the Pilcomayo and Bermeja rivers and will cost several millions of dollars owing to the sinuous route it must traverse. Nazareno is located in one of the wealthiest agricultural and mining sections of Bolivia with three large companies, exploiting the lead mines of the vicinity.

Most of the Bolivian towns are off the railroad. There are diligence lines connecting the larger towns with the railroads, but most of these are in operation for only eight or nine months of the year, and are mainly for passengers only.

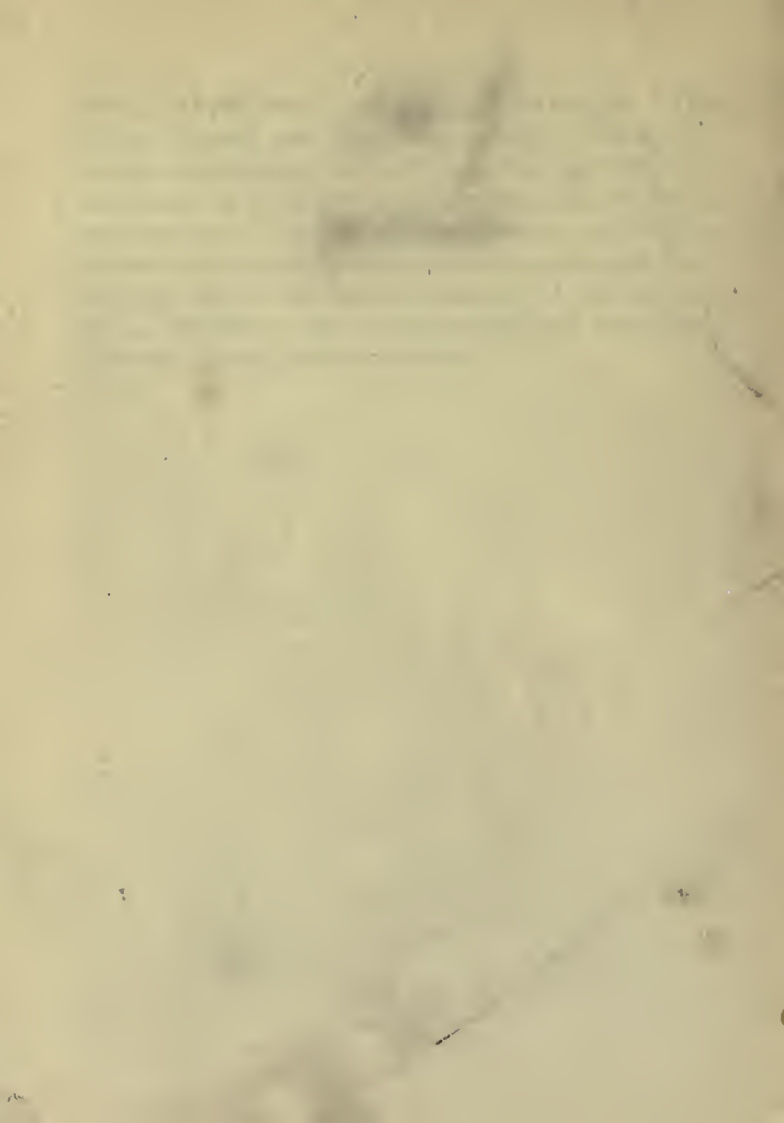
The transfer of freight throughout the interior of Bolivia is by means of donkeys, llamas, mules, and on the back of Indians.

THE CAMEL OF THE ANDES

The llamas—the camels of the High Andes—are about 4 feet 6 inches high, carry about 100 pounds, and travel at a slow pace, rarely making over 10 miles a day. The Indians never ride them, in fact the animal is too weak to carry a man. Though so weak and so slow in their movements they are valuable beasts of burden, as they are not affected by the highest altitudes and require no attention, feeding on the short

tufts and brushwood to be found on the hillsides. The Indian himself can carry heavy loads. He always carries everything on his back, never on his head or in his hands. It is curious to see him loading. He kneels with his back to the bale throws around it two or three coils of a rope which he knots across his chest, and then, bending over on his face, he staggers to his feet and moves off with a load that two men can hardly lift from the ground with their hands.





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